The American Journal of Surgery

THURSTON SCOTT WELTON, M.D., *Editor*

Associate Editors

BRADLEY L. COLEY, M.D. · ARNOLD S. JACKSON, M.D.

E. ERIC LARSON, M.D.

PROCTOLOGY

Papers Read at the June 1948
Meeting of
The American Proctologic Society

December 1948

VOLUME LXXVI · NUMBER 6

FIFTY-SEVENTH YEAR OF PUBLICATION

EDITORIAL BOARD

The American Journal of Surgery

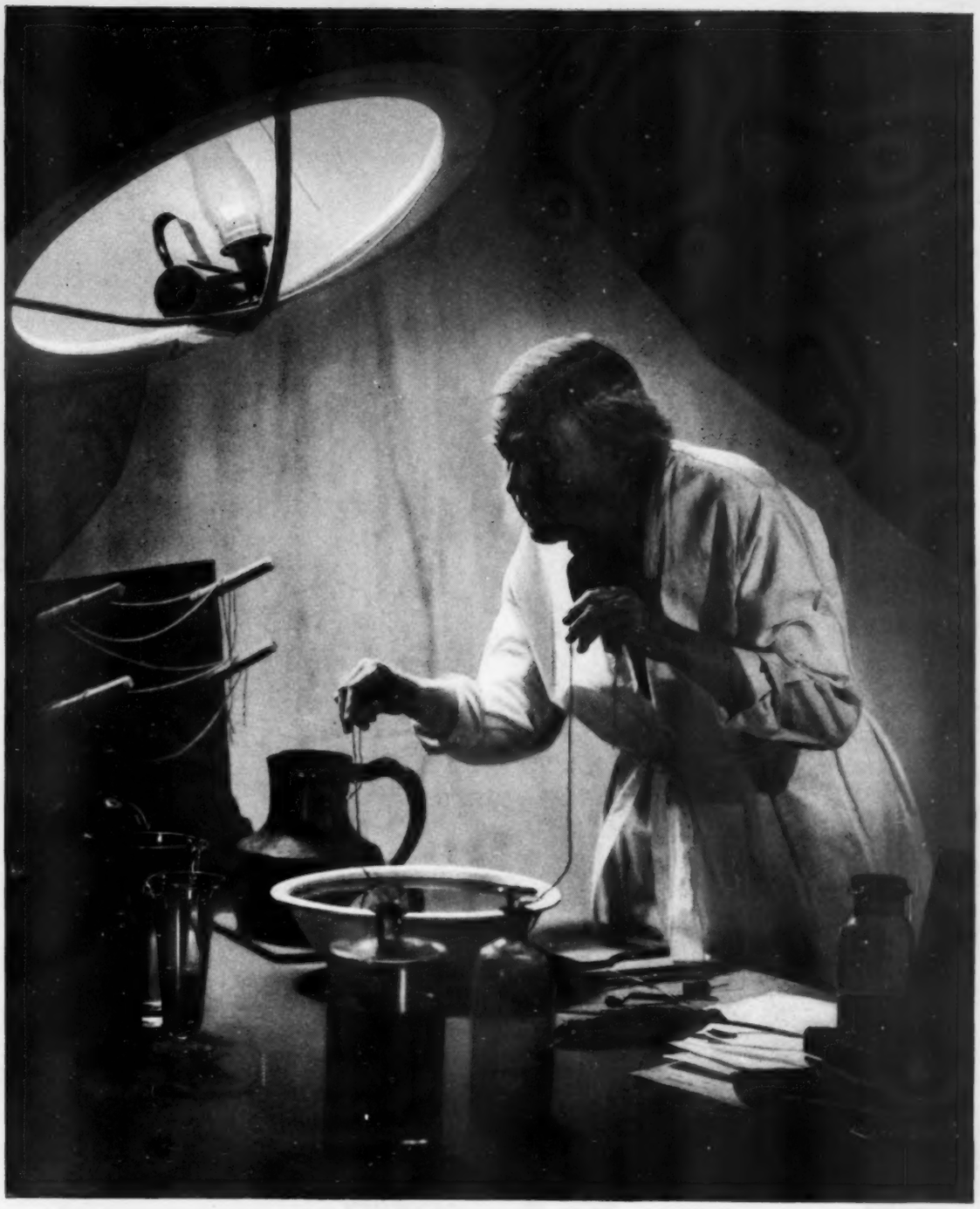
Editor THURSTON SCOTT WELTON, *New York*

Associate Editors BRADLEY L. COLEY, *New York* · ARNOLD S. JACKSON, *Madison* · E. ERIC LARSON, *Los Angeles*

ADVISORY BOARD

CLAUDE S. BECK, *Cleveland*
GEORGE R. BRIGHTON, *New York*
MEREDITH F. CAMPBELL, *New York*
JAMES T. CASE, *Chicago*
ISIDORE COHN, *New Orleans*
FREDERICK A. COLLER, *Ann Arbor*
PAUL C. COLONNA, *Philadelphia*
GORDON S. FAHRNI, *Winnipeg*
HERBERT C. FETT, *Brooklyn*
EMIL GOETSCH, *Brooklyn*
CHARLES A. GORDON, *Brooklyn*
DONALD GUTHRIE, *Sayre, Pa.*
LOUIS J. HIRSCHMAN, *Detroit*
EMILE F. HOLMAN, *San Francisco*
CLAUDE J. HUNT, *Kansas City, Mo.*
THOMAS J. KIRWIN, *New York*
ARTHUR KRIDA, *New York*
New York, ADRIAN V. S. LAMBERT
New York, JEROME M. LYNCH
New Orleans, URBAN MAES
Newark, HARRISON S. MARTLAND
New Orleans, RUDOLPH MATAS
Detroit, ROY D. MCCLURE
Toronto, D. W. GORDON MURRAY
San Francisco, H. C. NAFFZIGER
Baltimore, EMIL NOVAK
Newark, CLARENCE R. O'CROWLEY
Boston, LOUIS E. PHANEUF
Rochester, Minn., JAMES T. PRIESTLEY
Brooklyn, NATHANIEL P. RATHBUN
Raleigh, HUBERT A. ROYSTER
Philadelphia, HENRY S. RUTH
Memphis, ROBERT L. SANDERS
Baltimore, GRANT E. WARD
Woodland, Calif., J. HOMER WOOLSEY

The American Journal of Surgery is published monthly by The Yorke Publishing Co., Inc., 49 West 45th Street, New York 19, N. Y. Yearly Subscription, $12.00 U. S. A.; $14.00 Canada and Pan-American Countries; $15.00 Foreign. Single Numbers $2.00; Special Numbers $4.00. Entered as second class matter August 28, 1926, at the Post Office, New York, N. Y., and on August 28, 1926, at York, Pa., under the act of March 3, 1879. December, 1948—New Series, Volume LXXVI, No. 6. *Copyright, 1948, by The Yorke Publishing Co., Inc.*



Joseph Lister

(1827-1912)

SUTUREGRAM

NUMBER TEN IN A SERIES

Complications of Suturing (continued)

Evisceration

Wound develops sero-sanguinous discharge 5th to 9th day postoperatively.

Skin wound bulges over separated tissues beneath

If above signs are present remove one or two sutures and inspect beneath

Evisceration occurs after sutures are removed

SUTUREGRAM

NUMBER TEN (CONTINUED)

Causes of Evisceration

Insecure closure and Failure of Healing of peritoneum and posterior sheath.

1. Causes of Insecure Closure
   a. Tissues thin – sutures tear out easily
   b. Necrosis of tissues
   c. Unusual strain
   d. Sutures rapidly absorbed
   e. Knot becomes untied

2. Failure of Healing . . . .

Local Causes
- Inadequate blood supply
- Infection
- Interposition of omentum

General Causes
- Anemia
- Malignancy
- Low serum protein
- Low tissue – vitamin C

3. Disruptive Forces

Those that excessively increase intra-abdominal pressure or spasmodically contract abdominal wall such as coughing, straining at stool, gaseous distention, sudden movements, etc.

When Silk is the Suture

of Choice use . . .

D&G ANACAP* SURGICAL SILK

Non-irritating to the tissues and therefore causes minimal cellular reaction

Provides firm support to the wound throughout the healing period

Does not slip at the knot

Suture will not untie when cut close to the knot

Absolutely non-capillary under all conditions to which sutures are exposed

Unaffected by boiling, autoclaving, or by the action of tissue fluids or irrigating solutions

Utterly bland and free from stiffening lacquers or traumatizing substances

DAVIS & GECK, INC.
BROOKLYN 1, NEW YORK
**Registered Trade-mark*

JOSEPH LISTER (1827-1912)—To no individual does surgery owe more than to Joseph Lister. Terrors of hospital gangrene were banished forever by his aseptic method based on the work of Louis Pasteur, and further development has made possible the vastly enlarged scope of modern surgery. Yet Lister made other important surgical contributions, among which were technics for amputation through the condyles of the femur, for excision of the wrist joint, for carcinoma of the breast and for surgery of the bladder and urethra. His experiments with suture materials led to the development of modern catgut.

Medicine
rides Apollo's chariot

Contemporary Medicine soars to increasing heights of success in its labors against disease.

In 1937, the national total of reported smallpox cases was 11,673.

By 1947, the number had dropped to 173.

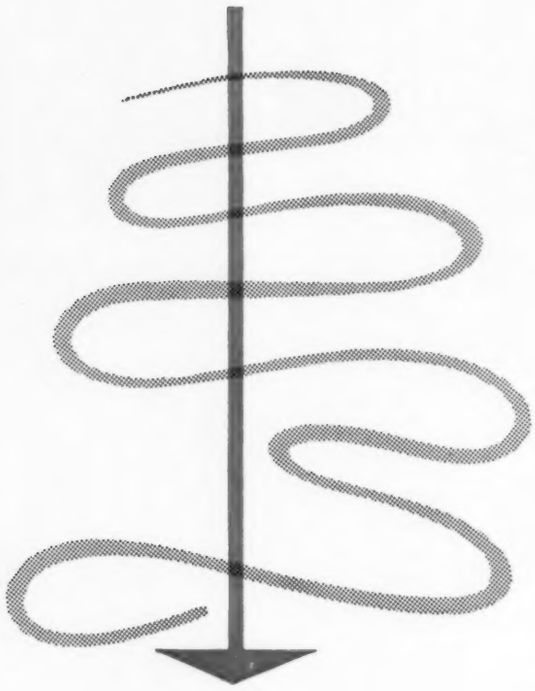
This represents a reduction of more than 98 percent in the space of one decade.

Thus another once dread disease rapidly nears extinction.

Contemporary Medicine is a story of progress achieved through cooperative effort . . . a story of enlightened teamwork on the part of the clinician, the research worker, and Pharmacy, as exemplified in the modern pharmaceutical laboratory.

At Bristol Laboratories, we recognize the privilege of sharing in this cooperative effort. Success in discharging this trust is measured by the increasing thousands of physicians who specify Bristol.

Bristol
LABORATORIES INC.
SYRACUSE, NEW YORK



direct route

Whenever oral vitamin B complex therapy seems ineffective, Ampoules 'Betalin Complex' (Vitamin B Complex, Lilly) are recommended for intravenous or intramuscular use in doses of 1 to 4 cc. daily. The *direct route* assures complete utilization. Impaired absorption is circumvented, and large amounts of the B complex vitamins are immediately available.

'Betalin Complex' is a prepared solution containing in each cc.:

Thiamin Chloride	5 mg.
Riboflavin	2 mg.
Nicotinamide	75 mg.
Pantothenic Acid (as Calcium Pantothenate)	2.5 mg.
Pyridoxine Hydrochloride	5 mg.

Lilly

ELI LILLY AND COMPANY

Indianapolis 6, Indiana

The American Journal of Surgery

VOL. LXXVI — *Contents • December, 1948* — NUMBER SIX

Presidential Address

Present Status of Proctology as a Surgical Specialty in the United States . . . . . *George H. Thiele* 637

Papers of the Scientific Sessions

Colloid Adenocarcinoma Involving the Perianal Region, Anus, Rectum or Sigmoid Colon . . . . *John R. Hill and Newton D. Smith* 642

Choice of Operation in Carcinoma of the Left Half of the Large Bowel . . . . . *Raymond W. McNealy and Francis D. Wolfe* 646

Surgical Management of Lesions of the Large Bowel . . . . . *Harry E. Bacon and George D. Vaughan* 648

Selection of Patients and Anastomotic Procedures for Carcinoma of Rectum and Rectosigmoid . . . . . *R. Russell Best* 654

Polyposis of the Colon in Children . . . . . *Jack G. Kerr* 667

Treatment of Hemorrhoids . . . . . *G. Johnson Hamilton* 672

The Problem of Foreign Bodies in the Colon and Rectum . . *F. George ReBell* 678

Sacral and Presacral Tumors . . . . . *Stuart T. Ross* 687

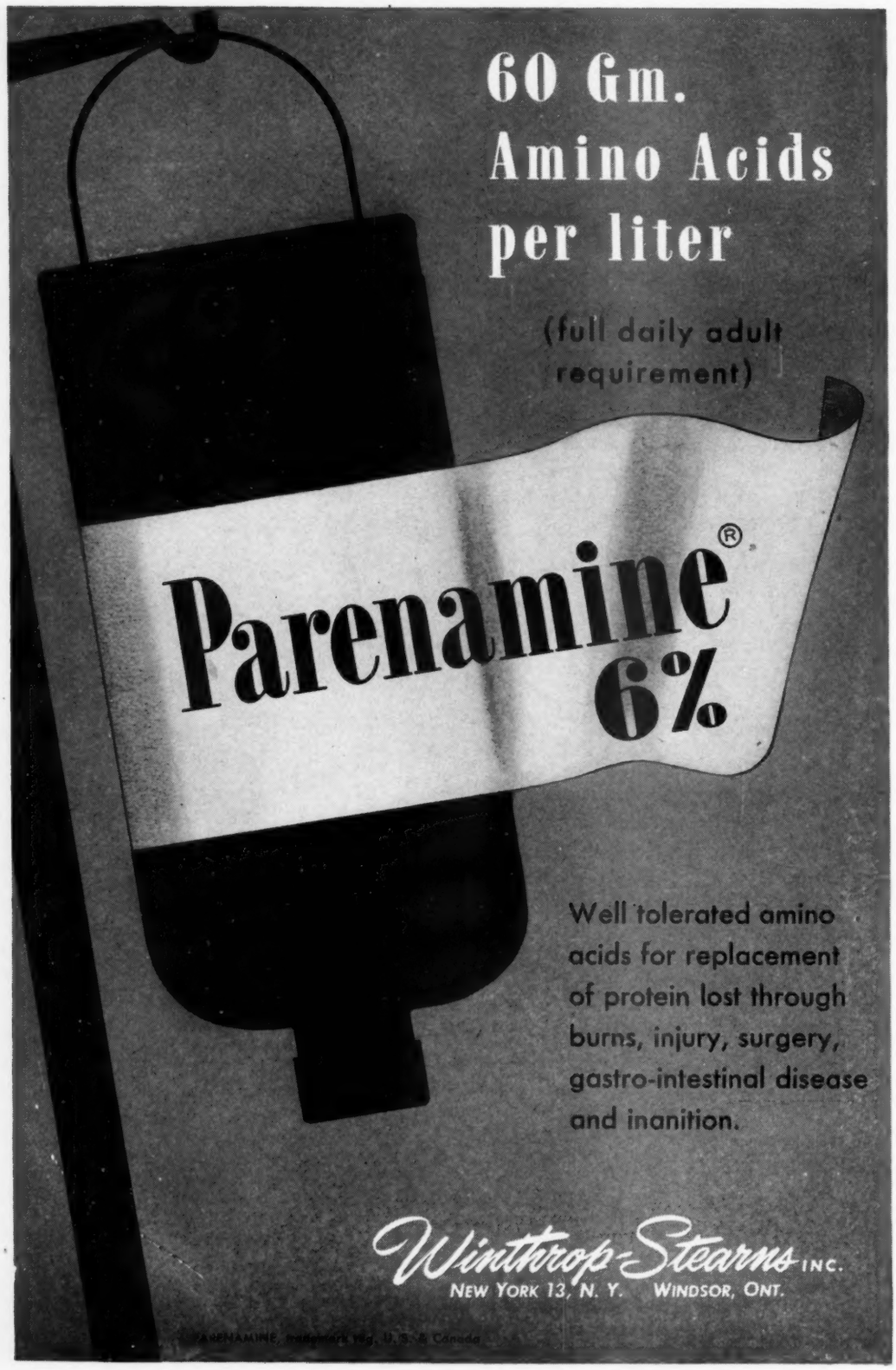
Organization and Operation of a Department of Proctology in a U.S. Veterans Hospital. Some Experiences Gained from the First Year's Operation . . . . . *William C. Bernstein* 694

Procedures Used in Treatment of Complicated Fistulas . . . *Donald R. Laird* 701

One Year's Treatment of Non-specific Ulcerative Colitis with Intestinal Extract . . . . *Benjamin Haskell and M. H. F. Friedman* 709

Surgical Treatment of Non-specific Ulcerative Colitis . . . . . *Walter A. Fansler and Howard M. Frykman* 713

Contents Continued on Page 5


60 Gm.
Amino Acids
per liter
(full daily adult requirement)
Parenamine®
6%
Well tolerated amino acids for replacement of protein lost through burns, injury, surgery, gastro-intestinal disease and inanition.
Winthrop-Stearns INC.
NEW YORK 13, N. Y. WINDSOR, ONT.
PARENAMINE, Registered Reg. U.S. & Canada

The American Journal of Surgery

Reg. U. S. Pat. Off., Nov. 3, 1936

VOL. LXXVI — Contents • December, 1948 — NUMBER SIX

Polypoid Lesions of the Colon and Rectum . . . . . *Robert A. Scarborough and Russell R. Klein* 723

Rôle of the Pathologist in the Diagnosis of Polypoid Lesions of the Colon and Rectum . . . . . *Ferdinand C. Helwig* 728

Surgical Treatment of Polyps of the Large Intestine . . . *Richard B. Cattell* 733

Case Reports

Retrorectal Paraganglioma with Metastasis . . . . . *Vincent T. Young* 748

Anomalous Development of Anal Papillae . . . . . *Herbert I. Kallet* 750

Rectal Calculus of Unusual Size . . . . . *George L. Becker* 752

Papers Read by Title

Chronic Burrowing Ulceration of the Perineum Due to Microaerophilic Hemolytic Streptococcus . . . . . *John Cheleden* 754

Pruritus Ani. A Study of Results with Gentian Violet in 210 Cases . . . . . *James T. Jenkins* 763

Lymphopathia Stricture of Rectum Complicated by Secondary Stricture of Ascending Colon of Probable Tuberculous Origin . . . . . *W. A. Scheffler* 767

Benign Lymphoma of the Rectum . . . . . *David Miller* 769

New Sclerosing Agent for Hemorrhoids. A Three-year Study . *Max P. Cowett* 770

Perianal Infection in the Tuberculous Patient. Clinical Notes . *Julius Gerendasy* 774

Colonic Adenomas . . . . . *Robert Turell* 783

Author Index to Volume LXXVI 790

Subject Index to Volume LXXVI 791

General Information on Page 6 *Advertising Index on 3rd cover*

General Information

THE AMERICAN JOURNAL OF SURGERY does not hold itself responsible for any statements made or opinions expressed by any contributor in any article published in its columns.

Articles are accepted for publication with the understanding that they are original contributions never previously published. All manuscripts are subject to editorial modification, and upon acceptance become the property of THE AMERICAN JOURNAL OF SURGERY.

A reasonable number of illustrations are supplied free of cost; special arrangements must be made with the editor and publishers for excess illustrations and elaborate tables.

Reprints are furnished on order. Prices are quoted when articles are in page form.

Material published in THE AMERICAN JOURNAL OF SURGERY is copyrighted and may not be reproduced without permission of the publishers.

Change of address must reach us by the 15th of the month preceding month of issue.

PREPARATION OF MANUSCRIPTS

Text. Manuscripts are to be typewritten, on one side of the paper, with double spacing and good margins. The original should be sent to the editor and a carbon copy retained by the author.

Illustrations. Illustrations must be in the form of glossy prints or drawings in black ink (*never* in blue). On the back of each illustration the figure number, author's name and an indication of the top of the picture should be given. Legends for illustrations are to be typewritten in a single list, with numbers corresponding to those on the photographs and drawings. Please do not attach legends to the pictures themselves.

Bibliographies. Bibliographic references should be at the end of the manuscript and not in footnotes. Each reference should include the following information in the order indicated: Name of author with initials; title of article; name of periodical; volume, page and year. The following may be used as a model:

PHANEUF, LOUIS E. Indications and technique. *Am. J. Surg.*, 25: 446, 1937.

The author should always place his full address on his manuscript.

The subscription price of THE AMERICAN JOURNAL OF SURGERY, is $12.00 per year in advance in the United States; $14.00 in Canada and Pan-American countries and $15.00 in foreign countries. Current single numbers $2.00. All Special Numbers $4.00. Prices for such back numbers as are available will be quoted on request.

Address all correspondence to

The American Journal of Surgery

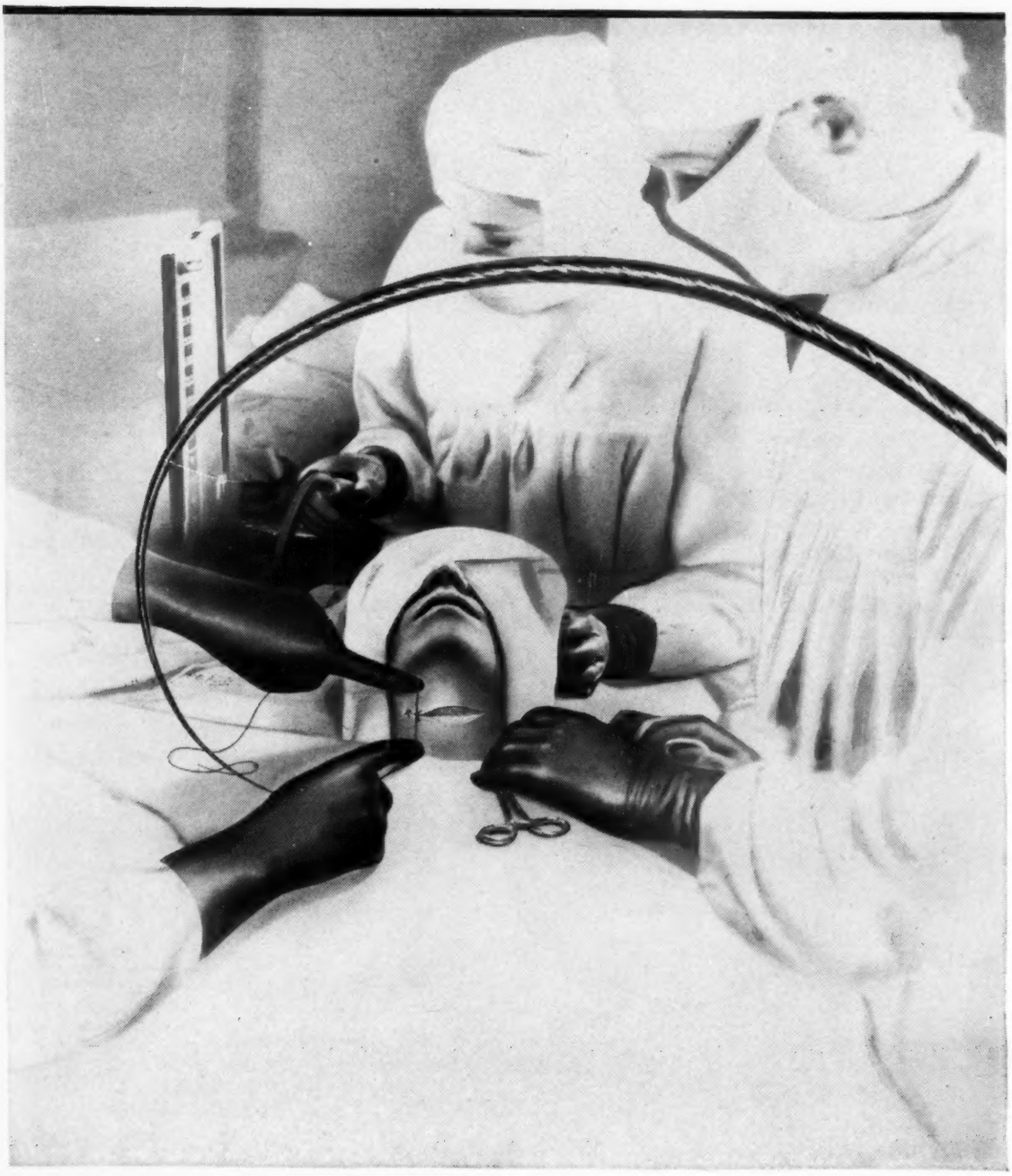
49 WEST 45TH STREET · NEW YORK 19

Bovine blood can be collected and handled under carefully controlled, sanitary conditions. Protein Hydrolysate, Baxter, is prepared from the plasma of this blood because plasma proteins properly processed are good proteins*. Enzymatically digested, the proteins are converted into amino acids and peptides with a minimum change in structure. A new booklet, Protein Hydrolysate, Baxter, is yours for the asking. Baxter Laboratories, Morton Grove, Illinois.

Journal of the American Dietetic Assn. Vol. 23 #10 Page 841 October 1947.

American Hospital Supply Corporation • General Offices, Evanston, Illinois

DEPENDABILITY—



Curity non-absorbable sutures

Widely known, widely used, Curity Sutures satisfy exacting surgical demands

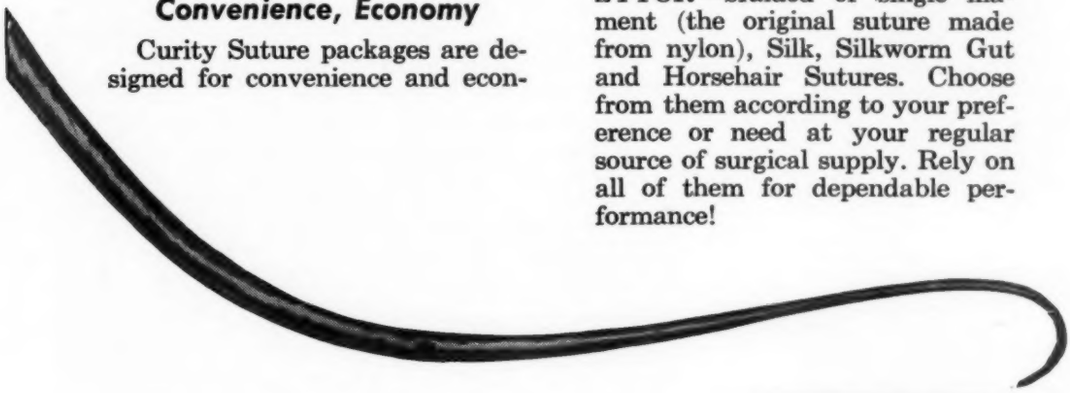
The quality of Curity Non-absorbable Sutures is high, uniform and constant. That's why surgeons rely today—as they have for many years—on Curity Sutures for all types of exacting operative work. It is *dependable performance* that has made Curity Dermal and Tension Sutures, for instance, the most widely used skin and stay sutures in current surgery.

Convenience, Economy

Curity Suture packages are designed for convenience and economy. For quick emergency use, choose a sterile envelope or tube. When time is not a factor, save money with non-sterile boxes or spools. In either case, Curity Non-absorbable Sutures will meet your needs exactly.

Variety of Choice

Curity Non-absorbable Sutures comprise Dermal and Tension, ZYTOR—braided or single filament (the original suture made from nylon), Silk, Silkworm Gut and Horsehair Sutures. Choose from them according to your preference or need at your regular source of surgical supply. Rely on all of them for dependable performance!



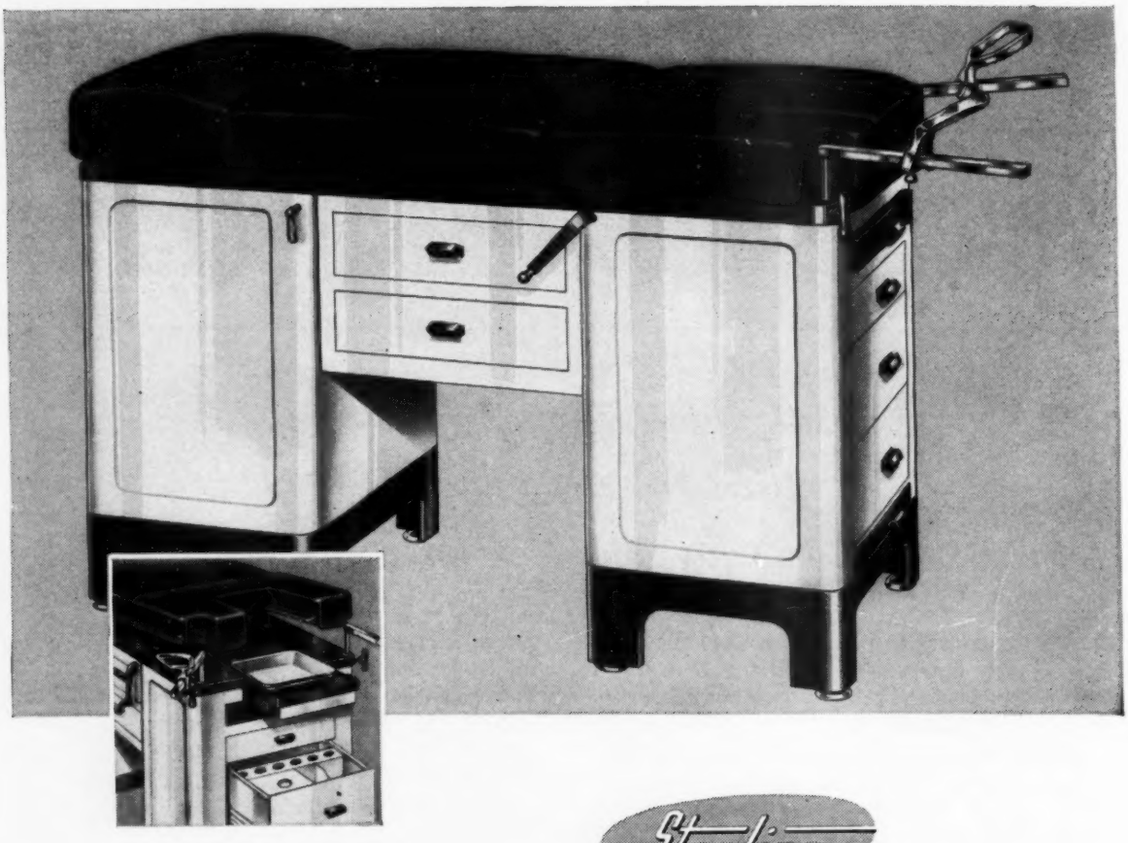
ORDER THROUGH YOUR DEALER

Curity Suture Laboratories

BAUER & BLACK

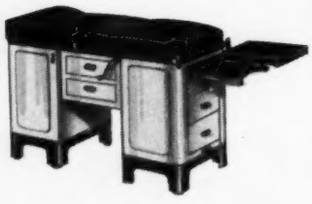
Division of The Kendall Company, Chicago 16

SUTURE RESEARCH . . . TO ESTABLISH A FINE BALANCE OF NECESSARY CHARACTERISTICS



Steeline

FINE TREATMENT ROOM FURNITURE



Oversize Treatment Table with Built-in Irrigator

Designed both for beauty and utility, this table will give a lifetime of service because of its patented Steeline construction. Examine the illustration critically Note the modern, graceful lines that connote assurance and dignity. Note the complete versatility, the many practical, built-in features that are the result of advice received from hundreds of physicians. Aloe's patented Steeline is a new and exclusive development in functional physicians' office and treatment room furniture. Each Steeline unit has an electrically welded framework that cannot shrink or loosen in any climate; rounded, easily cleaned corners, black base and top. Three coats of mar-proof enamel, electrically baked on to stay. Your choice of colors.

Write today for full information and prices on Steeline Professional Clinical Equipment

A. S. ALOE COMPANY *Serving the medical profession since 1860*

aloe

1831 Olive Street • St. Louis 3, Missouri

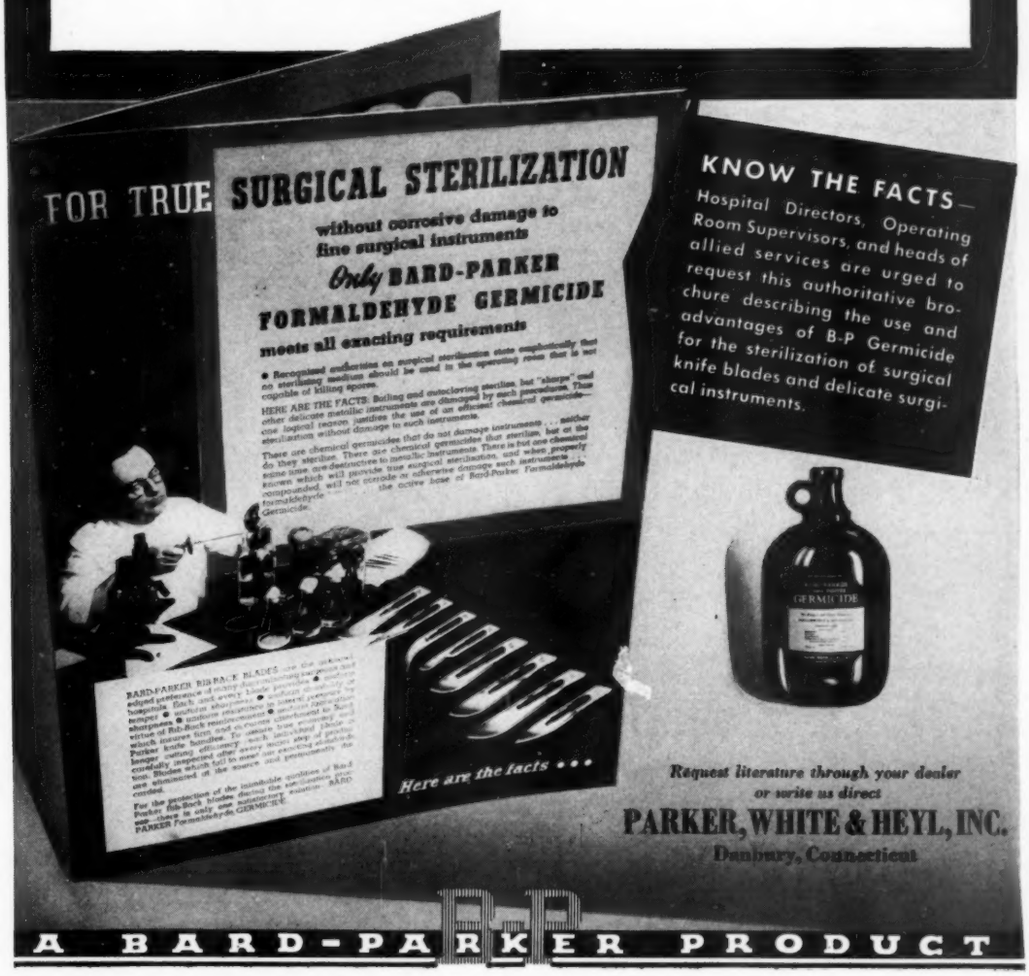
FOR THIS VITAL PROBLEM

. . . only one satisfactory *SOLUTION*

BARD-PARKER FORMALDEHYDE GERMICIDE

TRUE SURGICAL STERILIZATION of delicate steel instruments and keen cutting edges must embrace the total destruction of vegetative bacteria, spore-formers and their spores. Surgical sterility must be attained within a reasonably short period of time to be practical for hospital purposes. The medium or method employed should offer complete protection against rust or corrosive damage to the factory-new qualities of such instruments, leaving their efficiency and life expectancy unimpaired.

The bactericidal and sporicidal potency of B-P Germicide accomplishes the destruction of pathogenic vegetative bacteria within 5 minutes . . . the most highly resistant spores of *Cl. tetani* in 3 hours. It will not rust, corrode or otherwise damage delicate steel instruments or keen cutting edges. NO METHOD OR MEDIUM EXTANT PROVIDES THESE COMBINED, EQUIVALENT PROPERTIES.


FOR TRUE SURGICAL STERILIZATION
without corrosive damage to fine surgical instruments
Only BARD-PARKER FORMALDEHYDE GERMICIDE
meets all exacting requirements
KNOW THE FACTS—
Hospital Directors, Operating Room Supervisors, and heads of allied services are urged to request this authoritative brochure describing the use and advantages of B-P Germicide for the sterilization of surgical knife blades and delicate surgical instruments.
Here are the facts • • •
GERMICIDE

Request literature through your dealer or write us direct

PARKER, WHITE & HEYL, INC.
Danbury, Connecticut

B-P

A BARD-PARKER PRODUCT

A New High in Adaptability—

THE AMERICAN ALBEE-COMPER FRACTURE TABLE

provides all 3 desired features . . .

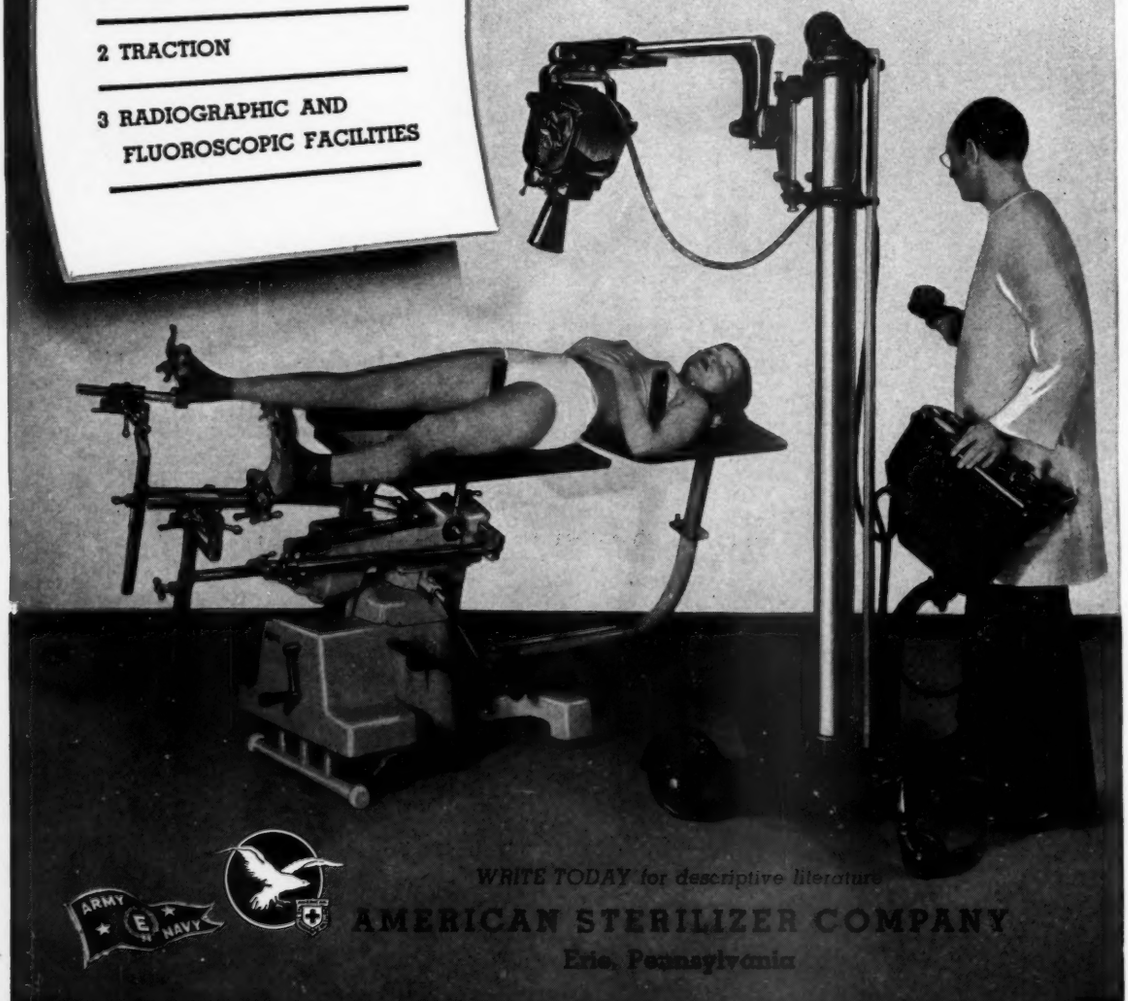
1 SURGICAL OPERATING

2 TRACTION

3 RADIOGRAPHIC AND FLUOROSCOPIC FACILITIES

Never before has one table offered the combined advantages afforded by this highly regarded equipment for open or closed fracture and orthopedic operations.

Fully maneuverable with Floor-lock and Trendelenberg ▲ Mechanically-operated Lateral Tilt ▲ Hydraulic Height-control ▲ Adjustable Table-tops for easy application of plaster casts ▲ Overhead Frame, mounted on mechanically controlled hoist for Davis hyper-extension, Sayre Suspension, etc.

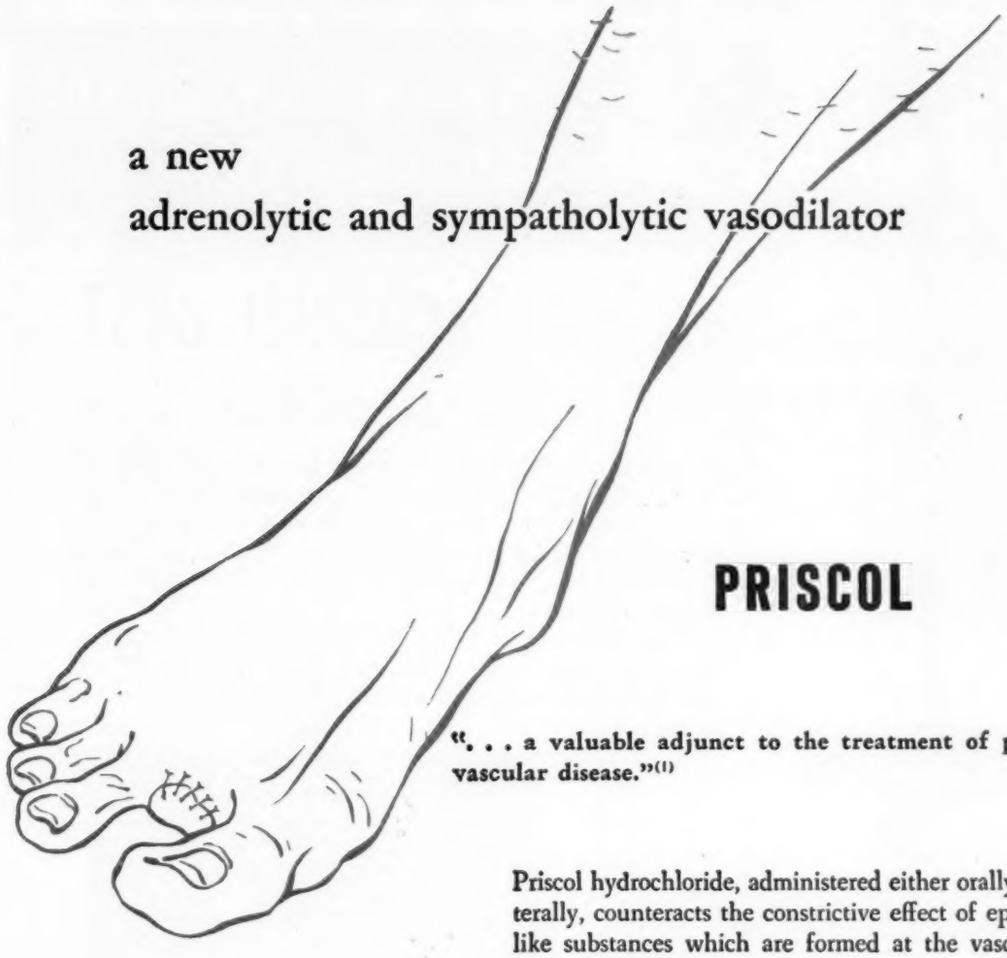


WRITE TODAY for descriptive literature

AMERICAN STERILIZER COMPANY

Erie, Pennsylvania

DESIGNERS AND MANUFACTURERS OF SURGICAL STERILIZERS, TABLES AND LIGHTS



a new
adrenolytic and sympatholytic vasodilator

PRISCOL

". . . a valuable adjunct to the treatment of peripheral vascular disease."[1]

Priscol hydrochloride, administered either orally or parenterally, counteracts the constrictive effect of epinephrine-like substances which are formed at the vascular myoneural junction.

Priscol therefore produces circulatory improvement in many cases of Raynaud's disease, Buerger's disease, diabetic gangrene, and arteriosclerotic peripheral vascular disease.

Patients should be closely observed until optimal dosage is established since paradoxical effects or orthostatic hypotension may occur.

Issued: Tablets of 25 mg.; bottles of 100 and 1000.
10 cc. Multiple-dose Vials, each cc. containing 25 mg.

1. Grimson, K. S., Marzoni, F. A., Reardon, M. J., and Hendrix, J. P.: *Surg.*, 23:728, 1948.

• Complete information may be obtained from

CIBA PHARMACEUTICAL PRODUCTS, INC., SUMMIT, NEW JERSEY

Ciba

8/1377M

PRISCOL (brand of benzazoline) Trade Mark Reg. U.S. Pat. Off.

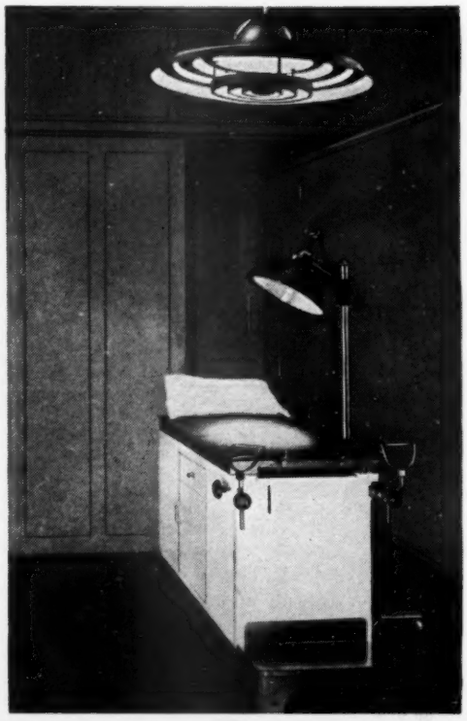
Hospital Lighting for Office and Clinic . . .

AT MODERATE COST

CASTLE No. 46 "ALL-PURPOSE" LIGHT

The No. 46 is designed for examining and operating . . . in offices, clinics and surgeries. Lamphead extends to 75″ (above head level), lowers to 48″ for compact storage. Internally counterbalanced for simple, quick, vertical adjustment without manual locks or clamps.

Provides soft, cool, color-corrected light . . . glareless and shadow-reducing . . . sufficient to illuminate the deepest cavity adequately.



CASTLE "G-V" FOR GENERAL LIGHT The Castle "G-V" (General Vision) Light bathes the entire room in a soft, glareless radiance that dispels eye-straining shadows and lighting contrasts . . . yet concentrates sufficient intensity of light at the table for all surface examination, treatment or repair work.

CASTLE NO. 1 SPOTLIGHT provides cool, color-corrected, glareless, shadow-free light to adequately illuminate the deepest cavity. Mobile, easily adjusted, and inexpensive.

FOR FULL DETAILS, see your Castle dealer, or write: Wilmot Castle Co., 1275 University Ave., Rochester 7, New York.

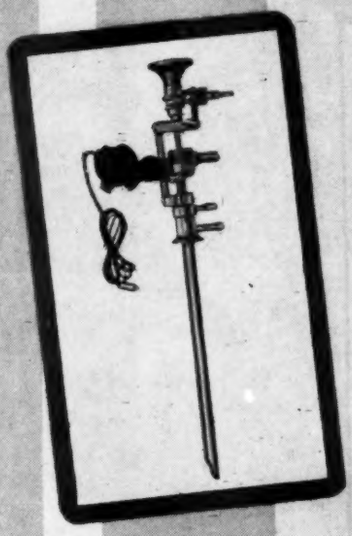
Castle LIGHTS AND STERILIZERS

for use with Wappler Surgical Unit C-263

Wappler Remote Control Unit

Now—Remote Control Unit provides electronic control of cutting and coagulating currents

Catalog
No. C-280



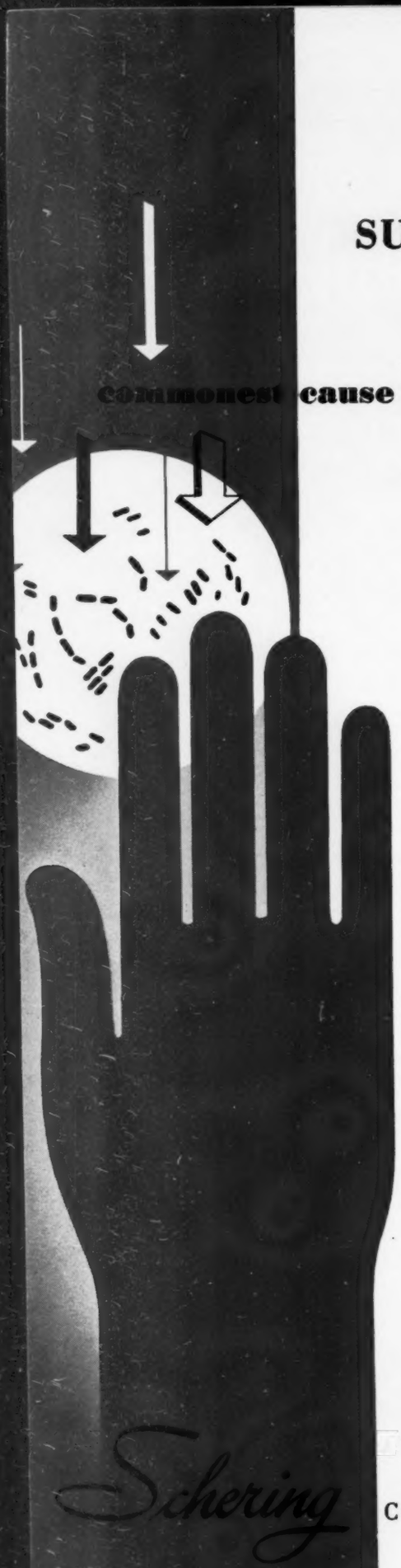
The McCarthy Electronic Switch—incorporated into the new Wappler Remote Control Unit—now brings remarkable flexibility and precision to the control and blending of electrosurgical cutting and coagulating currents produced by the standard Wappler Surgical Unit. This new electronic control helps to facilitate procedures and to improve techniques in electrosurgery. • The remote control unit consists of a small housing in which two microsensitive relays and a small filament transformer are contained. A supporting arm allows the unit to be mounted directly to the side of the surgical unit in a position convenient to the operator without interfering with the manipulation of the unit itself. Conducting cords connect with the power inlet supply and the electrosurgical unit.

WRITE FOR FULL INFORMATION

A.C.M.I. TRADE MARK

American Cystoscope Makers, Inc.

1241 LAFAYETTE AVE. FREDERICK J. WALLACE, *President* NEW YORK 59, N. Y.



SULAMYD FOCUSES ON THE *colon bacillus*

commonest cause of urinary tract infections . . .

SULAMYD* searches out and attacks *B. coli* so rapidly that "results that follow its use are uncanny. Occasionally the urine is sterile at the end of one day's treatment."[1]

RECOVERY or improvement in 98% of 200 cases of acute and chronic infections of the urinary tract was noted by Welebir and Barnes,[2] typical of the brilliant results achieved with SULAMYD. For prophylaxis, too,

SULAMYD

(Sulfacetimide-Schering)

is the chemotherapeutic agent of choice. In a group of 4,000 women treated prophylactically with various sulfonamides after pelvic surgery, SULAMYD proved the most effective, reducing urinary complications to less than 1%.[3]

HIGH DEGREE OF SAFETY is coupled with this remarkable antibacterial action. Highly soluble either in alkaline or acid urine and rapidly eliminated by the kidneys in high concentration, SULAMYD has an extremely low toxicity, far less than that of other sulfonamides.[4] Concrement formation has never been reported with SULAMYD.

SULAMYD (Sulfacetimide-Schering) Tablets of 0.5 Gm. in bottles of 100 and 1000. Bottles of 5.0 Gm. powder for laboratory determinations of urine and blood concentrations.

BIBLIOGRAPHY: (1) Wesson, M. B.: West. J. Surg. 49:662, 1941. (2) Welebir, F., and Barnes, R. W.: J.A.M.A. 117:2132, 1941. (3) Younge, P. A.: Urol. & Cutan. Rev. 49:422, 1945. (4) Kearns, W. M., in discussion on Herrold, R. D.: Wisconsin M. J. 41:467, 1942.

*®

Schering

CORPORATION · BLOOMFIELD, NEW JERSEY

IN CANADA, SCHERING CORPORATION LIMITED, MONTREAL

SULAMYD

SCHERING

Fig. 1. Position of operator and assistant as graft-cutting operation is begun.

Fig. 2. Graft being removed. Note uniform thickness, even edges and simplicity with which graft is cut. The graft is retracted as it lies on the bed from which it was removed, but yields a full two-inch width with ease.

A Simple SKIN GRAFT Knife for General Use

Fig. 3
Rigid handle

Dr. Geo. V. Webster, Pasadena, Calif., under above headline, wrote in AMERICAN JOURNAL OF SURGERY, in part: "...The one instrument with which the general surgeon has had most success ... is an old-fashioned straight razor... There are two difficulties... the razor is clumsy to hold...and rarely sharp...To obviate these difficulties a skin grafting knife has been constructed which consists of an inexpensive... rigid... handle (Fig. 3) with removable 'straight edge' single edge blade (Fig. 4) ...Such a knife is a remarkably successful instrument (Fig. 5)... No suction box, or other apparatus is necessary." Dr. Webster's complete article, includes also the "in use" illustrations shown above.

This Weck-made simple skin graft knife, complete, $3.60. Replaceable blades come in cartons of 50 for $3.34.

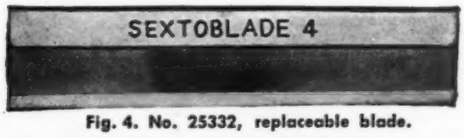


Fig. 4. No. 25332, replaceable blade.

Fig. 5
No. 25330
Blade and handle assembled

Ask for NEW brochure on Self-retaining Retractor.

REMEMBER WECK INSTRUMENTS ARE "MADE CORRECT — SOLD DIRECT."

Edward Weck & Co., Inc. Founded 1890
Manufacturers Surgical Instruments
SURGICAL INSTRUMENT REPAIRING • HOSPITAL SUPPLIES
135 Johnson Street Brooklyn, N. Y.

The Significance of Breakfast in Convalescence

Prompt correction of disrupted metabolic processes, the aftermath of disease or trauma, is ever a requisite in convalescence. To this end increasing recognition is being given to replenishment of the body's impaired nutrient stores by a carefully chosen dietary, partitioned equally over the day's three meals. Nutrition parity of the three meals minimizes both the digestive burden and the metabolic stress, and effects efficient nutrient utilization. Breakfast adequacy in convalescence, therefore, is especially significant.

A useful guide to an adequate and appetizing breakfast in convalescence is the universally commended basic breakfast pattern consisting of fruit, ready-to-eat or hot cereal, milk, bread and butter. Other suitable foods may be added as required if specific nutrient and caloric needs are high.

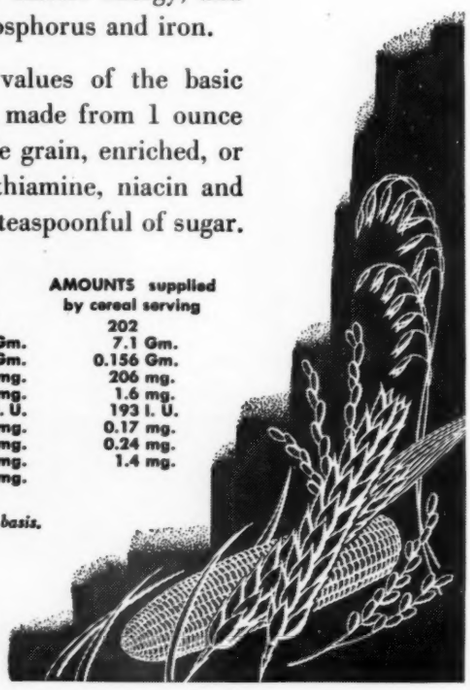
The cereal serving—hot or ready-to-eat breakfast cereal, milk, and sugar—is the distinctive main dish of this breakfast. It economically provides a noteworthy portion of the day's needs of biologically complete protein, B-complex vitamins, quickly available caloric energy, and the important minerals calcium, phosphorus and iron.

The table depicts the nutrient values of the basic breakfast and of the cereal serving made from 1 ounce of ready-to-eat or hot cereal* (whole grain, enriched, or restored to whole grain values of thiamine, niacin and iron), 4 fluid ounces of milk, and 1 teaspoonful of sugar.

BASIC BREAKFAST	TOTALS supplied by Basic Breakfast	AMOUNTS supplied by cereal serving
Orange juice, 4 fl. oz.;		
Ready-to-eat or Hot Cereal, 1 oz.;	CALORIES..... 611	202
Whole Milk, 4 fl. oz.;	PROTEIN..... 20.7 Gm.	7.1 Gm.
Sugar, 1 teaspoon;	CALCIUM.....0.465 Gm.	0.156 Gm.
Toast (enriched, white), 2 slices;	PHOSPHORUS.... 488 mg.	206 mg.
Butter, 5 Gm. (about 1 teaspoon);	IRON..... 3 mg.	1.6 mg.
Whole Milk, 8 fl. oz.	VITAMIN A..... 1074 I. U.	193 I. U.
	THIAMINE..... 0.52 mg.	0.17 mg.
	RIBOFLAVIN..... 0.87 mg.	0.24 mg.
	NIACIN..... 2.3 mg.	1.4 mg.
	ASCORBIC ACID.. 64.8 mg.	

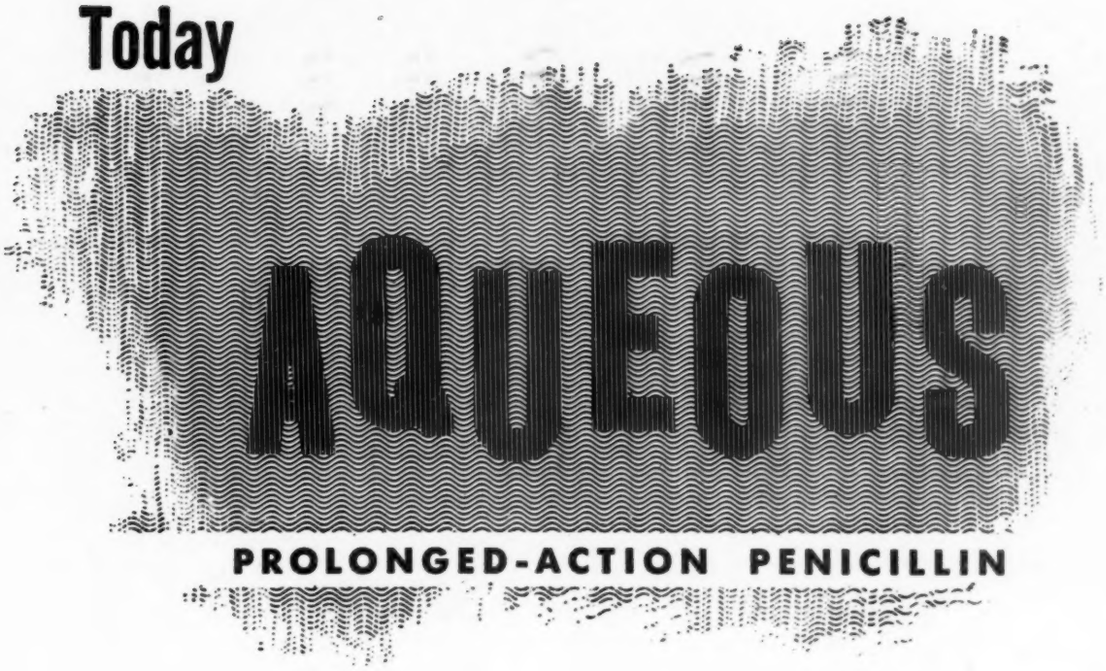
Composite average of all breakfast cereals on dry weight basis.

The presence of this seal indicates that all nutritional statements in this advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.



CEREAL INSTITUTE, INC.
A research and educational endeavor devoted to the betterment of national nutrition.
135 South La Salle Street • Chicago 3

Today



ADVANTAGES FOR YOUR PATIENT

aqueous ▸ yet only 1 injection a day

aqueous ▸ minimal pain . . . no oil—no wax

aqueous ▸ prolonged therapeutic blood levels

ADVANTAGES FOR YOU

aqueous ▸ easily suspended . . . stable for 21 days under refrigeration, or a week at room temperature, with no significant loss of potency. In powder form—stable for a year.

aqueous ▸ syringe and needle need not be dry; needle blockage minimized.

aqueous ▸ syringe and needle easily cleaned.

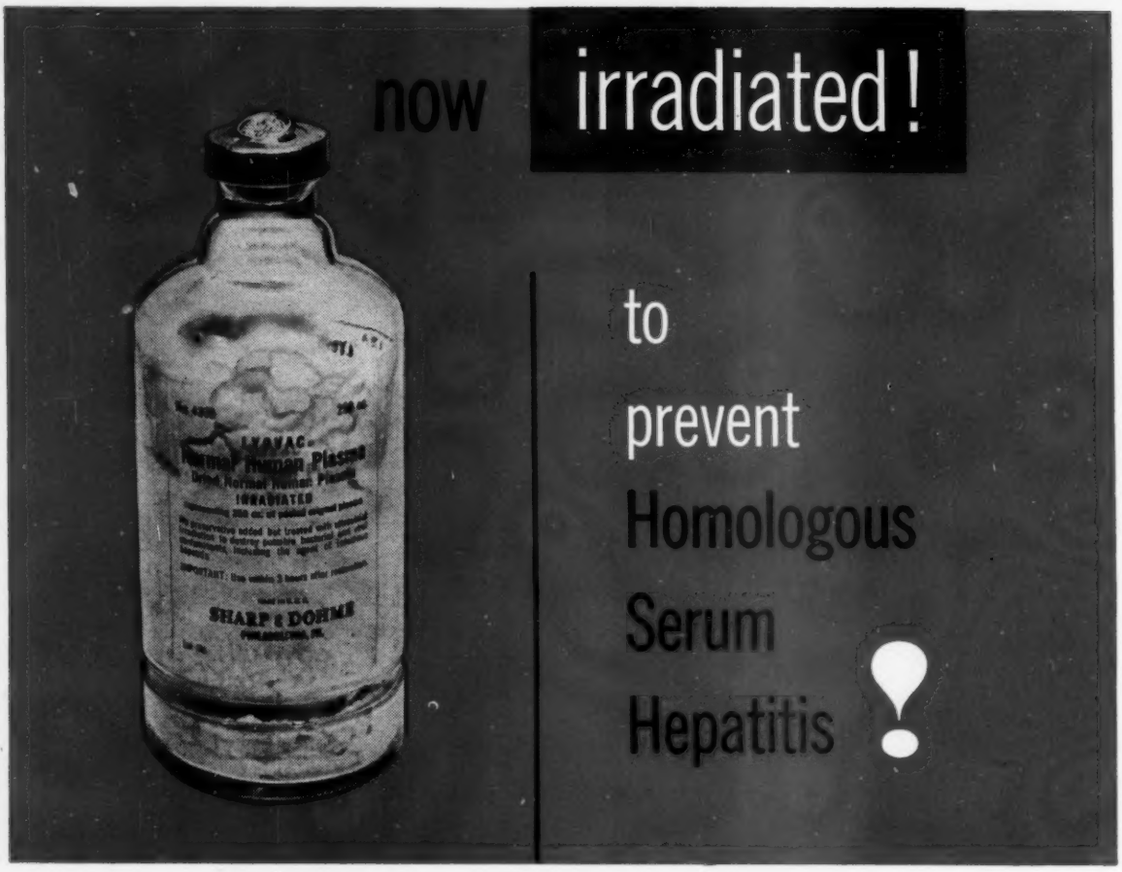
Crysticillin®

Squibb Procaine Penicillin for aqueous injection

a dry powder for the preparation of an aqueous suspension

- single-dose vials of 300,000 units with and without diluent
- multiple-dose vials of 1,500,000 and 3,000,000 units

SQUIBB A LEADER IN PENICILLIN RESEARCH AND MANUFACTURE



Ultraviolet irradiation of plasma destroys not only all bacteria but also any viral contaminants that might cause homologous serum hepatitis. • You may therefore administer *irradiated* LYOVAC *plasma* without danger of hepatitis. • Stable, portable LYOVAC Normal Human Plasma (*Irradiated*) is prepared from fresh, citrated, human blood of healthy donors, according to regulations of the National Institute of Health. The plasma is pooled, flash frozen, *dehydrated from the frozen state under high vacuum* (lyophile process), and sealed under vacuum. • *Blood substitute of choice for emergencies*, irradiated LYOVAC plasma is quickly restored, needs no typing or crossmatching, and each unit is osmotically equivalent to two units of whole blood. • LYOVAC Normal Human Plasma (*Irradiated*) is supplied in vacuum bottles to yield 50 cc., 250 cc. and 500 cc. of restored, *irradiated* normal plasma, or smaller quantities of *hypertonic* plasma. Sharp & Dohme, Philadelphia 1, Pa.

Lyovac®

SHARP & DOHME

Normal Human Plasma IRRADIATED

KOAGAMIN

PREOPERATIVELY—prevents oozing and allows the surgeon a clearer field of operation—lessening the need for local hemostatic measures.

POSTOPERATIVELY—controls secondary bleeding.

THERAPEUTICALLY—aids in the control of bleeding in gastric and duodenal ulcers, hematemesis, hematuria, hemorrhagic purpura, epistaxis, blood dyscrasias, etc.

Write for literature.

Chatham

CHATHAM PHARMACEUTICALS, INC.

NEWARK 2, NEW JERSEY

Distributed in Canada by FISHER & BURPE, LTD., Winnipeg, Manitoba

The newest in penicillin therapy . . .

D

96 HOURS

IN TH

Upjohn is privileged to announce the newest in the series of giant strides in penicillin therapy—DEPO-PENICILLIN—96-hour therapeutically effective blood levels made possible with a single injection of Upjohn's uniquely prepared Crystalline Procaine Penicillin G suspended in Peanut Oil containing 2% W/V Aluminum Monostearate. The Upjohn process of suspending smaller than 5 micra particles of Crystalline Procaine Penicillin G in Peanut Oil gelled with a dispersing agent also affords a free-flowing preparation which may be kept at room temperature. DEPO-PENICILLIN is recommended for use in all those conditions in which other forms of repository penicillin have been indicated.

*Trademark

Upjohn

LS SINCE 1886

Outstanding

IN TOPICAL ANTIBIOTIC THERAPY

LOW INDEX OF ALLERGENICITY—Bacitracin is outstanding in that its application topically is only rarely complicated by allergic manifestations. It therefore possesses a distinct advantage over many other antibiotics, freeing topical antibiotic therapy from this formerly serious limitation.

WIDE RANGE OF EFFECTIVENESS—While its spectrum of action largely parallels that of penicillin, Bacitracin is destructive to many strains of pathogens which are penicillin-fast. Thus it broadens the scope of antibiotic therapy and enhances its therapeutic efficacy.

PROMPT ACTION—Injected in solution into the base of pyogenic lesions, or applied topically in the form of an ointment, Bacitracin acts promptly upon the bacterial invasion. Response is apparent in most cases within a short period.

INDICATIONS—Bacitracin, topically administered, is indicated in the treatment of many deep pyogenic lesions of the skin, superficial cutaneous pyogenic lesions, and many external ocular infections due to Bacitracin-sensitive organisms. Bacitracin is administered topically only.

Bacitracin, in dry form for making solutions, is supplied in 20 cc. serum-type vials containing 2,000 and 10,000 units, and in 50 cc. vials containing 50,000 units. Also available as Bacitracin Ophthalmic Ointment in ⅛ ounce tubes and as Bacitracin Ointment in ½ ounce tubes, both containing 500 units per Gm. Literature available to physicians on request.

BACITRACIN

CSC

C.S.C. Pharmaceuticals

A DIVISION OF COMMERCIAL SOLVENTS CORPORATION, 17 EAST 42ND STREET, NEW YORK 17, NEW YORK

Outside the Ivory Tower

THE Third Postgraduate Assembly of The New York State Society of Anesthesiologists will take place at the Hotel New Yorker, New York City, on December 9th and 10th. An excellent program will be offered.

ANNOUNCEMENT has just been made by The Pioneer Rubber Company, Willard, Ohio, that neoprene Rollpruf surgical gloves are now being made in a new surgical green color. The primary reason, the manufacturer states, is to make it easy for surgeons and hospital staff to pick out the Rollpruf neoprene gloves which are otherwise indistinguishable from rubber gloves as they come from the autoclaves, especially after regular markings have worn off or become illegible. Many hospitals buy neoprene Rollprufs because they are evidently free of the allergen which in natural rubber causes dermatitis of the hands.

THE Pneophore is a small instrument now available for treating polio victims and persons suffering from respiratory ailments. The "heart" of the instrument is the small circular valve near the facepiece. It permits the flow of oxygen into the patient's lungs with intermittent positive pressure and is manufactured by the Mine Safety Appliances Company.

A NOTEWORTHY record of continuous ownership-management by members of a single family has already been achieved by the descendants of George P. Pilling, who in 1814 founded the surgical instrument house that still bears his name today. The firm, headed by Henry N. Pilling, President; Charles J. Pilling, Jr., Vice-President and Treasurer; and Dr. George P. Pilling, Secretary, has just announced that a representative of the fourth generation of the Pilling family has joined the company. He is H. Burgess Pilling, son of the present vice-president and a graduate of William Penn Charter School, Philadelphia. He was a student at Lehigh University but joined the 94th Infantry at the beginning of World War II. In the 3rd Army under General Patton he served overseas for one and one-half years in France, Czechoslovakia and Germany. After the close of the war Mr. Pilling returned to Lehigh University and was graduated in the class of 1948. With his addition to the staff of George P. Pilling & Son Company, the firm's long record of continuous family ownership promises to remain unbroken for many more years to come.

THE third grant made this year to The Research Council on Problems of Alcohol was made public today by Joseph Hirsh. Mr. Hirsh, Acting Director of The Research Council on Problems of Alcohol, announced that the grant of almost $5,000 was being made available to the Chicago Committee on Alcoholism for the conduct of research work in one of the leading institutions in that city.

IDENTIFICATION of a chemical substance in the tubercle bacillus as being responsible for the cell destruction characteristic of tuberculosis was announced by a Stanford scientist. The discovery, published in the current issue of the *Journal of Infectious Diseases*, is the outgrowth of three years of research by Dr. Sidney Raffel of the Stanford Medical School's department of bacteriology. His nomination for a new villian in the rogues' gallery of science is a wax-like substance which is a combination of starches and fatty acids. This bacillary wax or fat is the essential ingredient in determining that the body will respond to the protein in the tubercle bacillus with the delayed form of hypersensitivity or allergy which leads to progressive cell destruction in tuberculosis.

(*continue l on page* 34)

A Single Injection Every Other Day

Antibiotic therapy is greatly simplified when C.S.C. Crystalline Procaine Penicillin G in Peanut Oil with aluminum monostearate is prescribed. A single 1 cc. injection (300,000 units) produces therapeutic blood levels for 96 hours in over 90% of patients, *and for 48 hours in all patients.* For certainty of therapy, this preparation need not be given, as a rule, more often than once every other day.

Crystalline Procaine Penicillin G in Peanut Oil-C.S.C. contains 300,000 units of micronized procaine penicillin per cc., together with 2% aluminum monostearate for producing a thixotropic suspension. This outstanding penicillin preparation is free flowing and requires no refrigeration. It is indicated in the treatment of most infectious diseases amenable to penicillin therapy.

Available at all pharmacies in economical 10 cc. size rubber-stoppered vials (300,000 units per cc.), and in 1 cc. size (300,000 units) glass cartridges for use in the C.S.C. Disposable and Permanent Syringes.

96-HOUR
CRYSTALLINE PROCAINE PENICILLIN G
IN PEANUT OIL
WITH 2% ALUMINUM MONOSTEARATE

C.S.C. Pharmaceuticals

A DIVISION OF COMMERCIAL SOLVENTS CORPORATION, 17 EAST 42ND STREET, NEW YORK 17, NEW YORK

MEAT...

And the Cardiac Patient

The growing recognition of the many clinical applications of protein is reflected in the changing attitude towards the place of protein in the dietary of circulatory disease.* Particularly, elderly persons afflicted with coronary sclerosis and patients with heart failure of long duration are greatly benefited by an increased protein intake. Even when calories must be reduced in the daily diet it appears definitely advantageous to supply at least 60 to 70 Gm. of protein. When the patient's diet formerly had been severely restricted, a greater thiamine intake is also credited with good results.

Meat is an excellent source of biologically complete protein and of significant amounts of thiamine. These nutritionally advantageous features apply to all kinds, grades and cuts of meat. An additional advantage in the management of circulatory failure, especially in the aged, is the high digestibility of meat—from 96 to 98 per cent.

---

*Peete, D. C.: Nutrition in Cardio-Vascular Disease, Geriatrics 2:213 (July-Aug.) 1947.

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

ACCEPTED COUNCIL ON FOODS AND NUTRITION AMERICAN MEDICAL ASSOCIATION

American Meat Institute

Main Office, Chicago...Members Throughout the United States

Safeguard

AGAINST

PRE and POSTOPERATIVE

IRON-DEFICIENCY

ANEMIA

Iron-deficiency anemia is a factor to be considered in pre and postoperative conditions. Hence, we suggest that you prescribe Copperin routinely for a period preceding and following surgery. Copperin stimulates the hematopoietic system—provides material for replacement of hemoglobin—increases the red blood cell count.

Because in Copperin iron ammonium citrate is combined with the catalyst copper sulphate, there is a greater utilization of the iron by the system. For this reason the iron content per capsule is purposely small—32 Mgm. As there is no stomach irritation or constipating effect from Copperin, it is exceptionally well adapted to routine use. In two strengths: Copperin "A" for adults; Copperin "B" for children.

Liberal professional samples gladly sent on request

MYRON L. WALKER COMPANY, Inc.

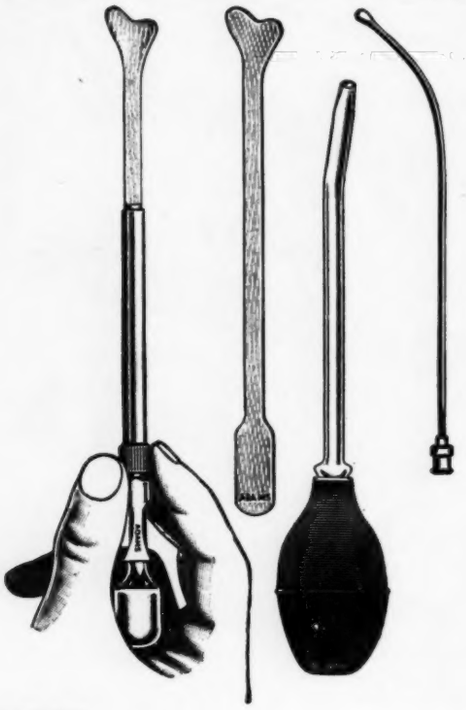
Mount Vernon **New York**

Kits and Supplies for PAPANICOLAOU-TRAUT and AYRE'S "SURFACE BIOPSY"

CYTOLOGY METHODS

for the diagnosis of early uterine cancer

IMPORTANT: The taking of smears, scrapings, etc. is a relatively simple matter and can be done by any trained physician, nurse or technician. **The staining and diagnosis should be done only by those prepared by intensive training in the technic.** Cytology intrepretation is highly specialized and requires the experienced judgment of cytologists especially trained in the field.



SUPPLIES:

A-2260	Ayre's "Surface Biopsy" Scrapers*.....	per M	$15.00
		per C	2.00
A-2263	Vaginal Pipettes, without rubber bulb.....	each	.60
A-2264	Aspirator Bulbs for Vaginal Pipettes.....	each	.60
A-2265	Handle for Ayre's Cervical "Surface Biopsy" Scrapers.....	each	5.00
A-2266	Cary Metal Uterine Cannula, malleable.....	each	1.50
A-1460X	"Rite-On" Slides, 3" x 1".....	gross	3.40
A-1625C	Two-Slide Mailers with envelopes.....	dozen	.95
A-2261	Bottle OG 6 and Bottle EA 50 (two bottles).....		6.00
A-2262	Bottle Harris Hematoxylin.....	each	1.25

* Pat. applied for.

KITS:

A-2257 Physicians' Uterine Cancer Cytology Outfit, consisting of: 4 dozen Ayre's "Surface Biopsy" Scrapers, 2 Vaginal Pipettes, 1 Aspirator Bulb, ½ gross "Rite-On" Slides, 2 dozen Two-Slide Mailers with envelopes, including directions. **Each $6.50**

A-2250 Diagnosticians' Uterine Cancer Cytology and Stain Outfit, consisting of: 1000 Ayre's "Surface Biopsy" Scrapers, 1 bottle each of OG 6 and EA 50, 1 bottle Harris Hematoxylin, 12 Vaginal Pipettes, 3 Aspirator Bulbs, 1 gross "Rite-On" Slides, 3 dozen Two-Slide Mailers with envelopes, including directions. **Each $36.00**

Visual Aids Available on Cytology Methods

Kodachrome Sound Film—16 mm.
"Medichrome" Photomicrographs—2 x 2" color slides
Write for Details

Write for Literature

CLAY-ADAMS COMPANY, INC.
141 EAST 25th STREET · NEW YORK 10
Showrooms also at 308 West Washington Street, CHICAGO 6, ILL.

Companion to hemostat and suture

OXYCEL®

Absorbable Hemostatic Oxidized Cellulose in gauze-type and cotton-type forms.

In the operating room and the office

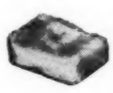
Where oozing persists despite ligation of all discernible blood vessels, OXYCEL applied as a surgical pack controls bleeding promptly. As vital as the surgeon's hemostat, OXYCEL minimizes trauma and shortens operative procedure.

Minor surgical procedures may be carried out with greater confidence and with less risk of psychic trauma to the patient. Use of OXYCEL controls bleeding that persists following placement of ligature and suture.

OXYCEL, Parke-Davis oxidized cellulose, is available in convenient forms of application to bleeding surfaces in body cavities and tissues. In surgical wounds in soft tissues, it is absorbed without producing irritation or delaying healing.

STRIPS

PADS

 PLEDGETS

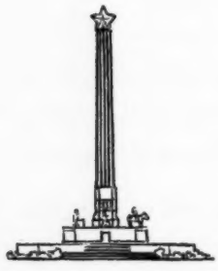
PACKAGE INFORMATION: Supplied in individual glass containers in the following convenient forms:
OXYCEL PADS: Sterile, gauze-type 3 in. x 3 in. eight-ply pads.
OXYCEL PLEDGETS: Sterile, cotton-type 2¼ in. x 1 in. x 1 in. portions.
OXYCEL STRIPS: Sterile, four-ply, gauze-type strips 18 in. x 2 in., pleated in accordion fashion.

PARKE, DAVIS & COMPANY · DETROIT 32, MICHIGAN

MEDICAMENTA VERA · PD CO.

Helsinki.....

calling Houston



A valuable guide covering every phase of the use of Pentothal Sodium—that is what you will find in the ever-growing bibliography on this excellent anesthetic. Since its introduction by Abbott in 1934, Pentothal Sodium has been the subject of more than 1100 published papers *from* and *for* every land in which modern surgery is practiced. These reports set forth in detail the indications and contraindications for Pentothal Sodium, precautions to be kept in mind, and techniques to be followed. With such an accurate and dependable record available, Pentothal Sodium can be used safely, effectively and conveniently. Wish to know more about it? A line to us will bring comprehensive information. ABBOTT LABORATORIES, North Chicago, Ill.

New Pentothal Film

A motion picture showing the uses and limitations of Pentothal Sodium anesthesia in obstetrical procedures is available to medical and hospital groups. ABBOTT LABORATORIES, North Chicago, Ill.

Pentothal® *Sodium*

(STERILE THIOPENTAL SODIUM, ABBOTT)

FOR INTRAVENOUS ANESTHESIA

PERMITS EFFECTIVE CHOLINE DOSAGE

because better tolerated

IN THE PREVENTION AND TREATMENT OF CIRRHOSIS AND ALLIED HEPATIC DISORDERS

Since the bicarbonate salt of choline is not conducive to nausea or other gastric distress, Syrup Choline Bicarbonate-C.S.C. is unusually well tolerated. Thus, in the treatment and prevention of fatty infiltration of the liver and portal cirrhosis, it permits administration of adequate dosage over the prolonged periods which may be required. Syrup Choline Bicarbonate-C.S.C. provides the equivalent of 12.5 per cent choline base or 14.4 per cent choline chloride.

Choline therapy, for maximum effectiveness, must be combined with a diet low in fat and providing large amounts of carbohydrate, B complex vitamins, and biologically complete protein.

Syrup Choline Bicarbonate is available at all pharmacies in pint bottles.

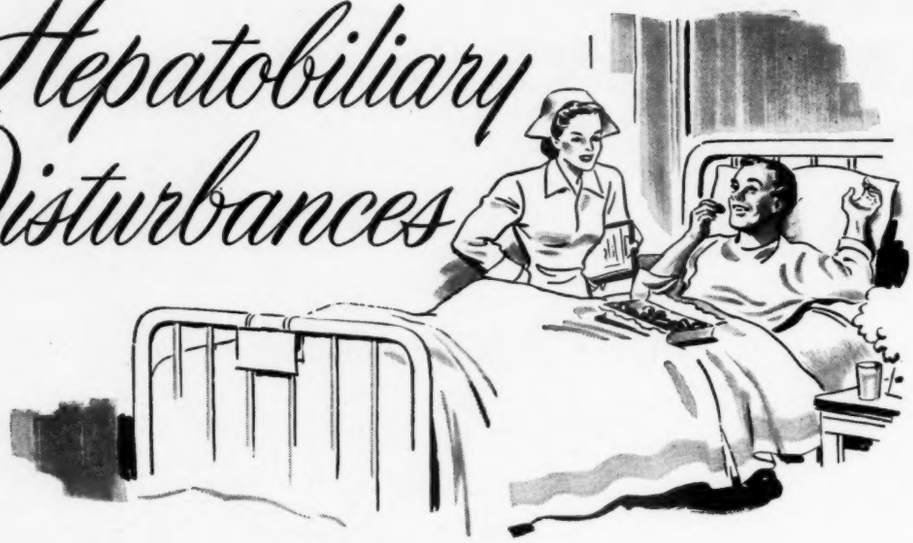
CSC

Syrup CHOLINE BICARBONATE

C.S.C. Pharmaceuticals

A DIVISION OF COMMERCIAL SOLVENTS CORPORATION • 17 EAST 42nd STREET • NEW YORK 17, N. Y.

IN *Hepatobiliary Disturbances*



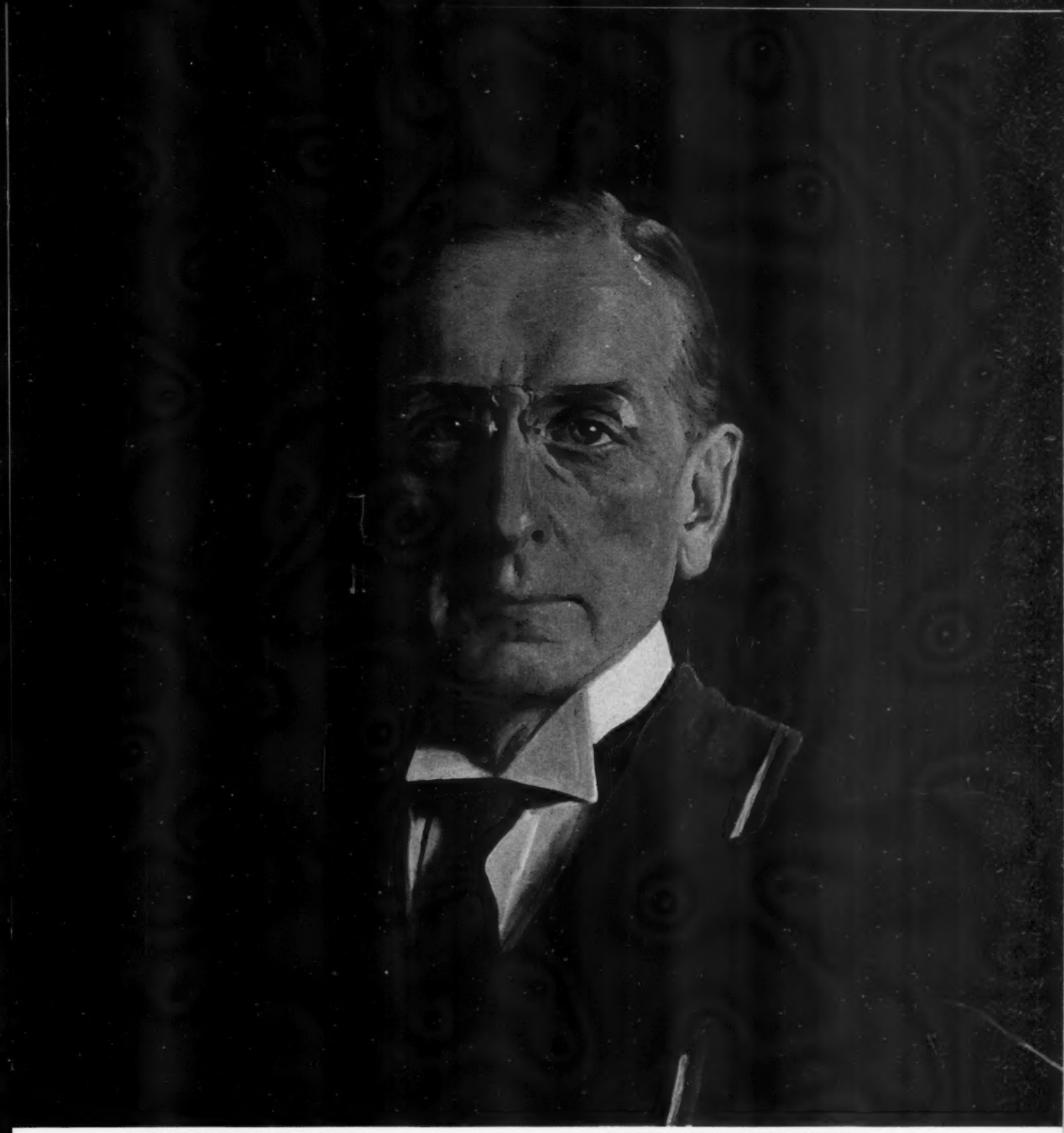
THE VALUE of carbohydrate in the treatment of liver disease is well established. Fatty infiltration and degeneration, cirrhosis, toxic and infectious hepatitis, and acute yellow atrophy respond favorably to the regimen of increased carbohydrate intake in conjunction with other appropriate dietary adjustments.

The inclusion of certain candies as one of the sources of carbohydrate in such regimens is more than welcomed by the patient. The palate appeal of candy aids in assuring ingestion of the prescribed amounts of carbohydrate, and its easy digestibility makes for satisfactory absorption of the contained carbohydrate.

Candies containing little or no fat are ideally suited for this purpose and can be kept handy at the bedside of the patient either in the home or hospital.

COUNCIL ON CANDY OF THE NATIONAL CONFECTIONERS' ASSOCIATION

1 NORTH LA SALLE STREET • CHICAGO 2, ILLINOIS



FROM THE PAINTING BY JULIAN LAMAR

COURTESY, AMERICAN COLLEGE OF SURGEONS

J. Bentley Squier

1873-1948

Master Genito-urinary Surgeon and Teacher; Professor of Genito-surgery, New York Postgraduate Medical School, 1909-1924, also director; Professor of Urology, Columbia University, College of Physicians and Surgeons, 1917-1939, later Emeritus Professor; Director, Squier Urological Clinic.

Member, General Medical Board of the Council of National Defense, 1917-1918; Major, Medical Reserve Corps, World War I; A Founder, Life Member and Regent, American College of Surgeons, President, 1932-1933; President, American Urological Association, 1913; President, American Association of Genito-urinary Surgeons, 1919-1920; Author of Articles and Books on Urologic Subjects.

From the Series, Great American Surgeons, Published by

ETHICON SUTURE LABORATORIES, DIVISION OF JOHNSON & JOHNSON, NEW BRUNSWICK, N. J.

"I'll want Atraloc 4-0 chromic for the anastomosis,
2-0 plain for the peritoneum, 0 chromic for fascia and silk
for the skin. Make sure they are all Ethicon."

"Make sure they're all Ethicon"

When you tell the float nurse what sutures you want, assure yourself of superior quality by adding, "and make sure they're all Ethicon."

Then, when you are ready to ligate or suture, the suture nurse will have ready for you Ethicon's new Bonded Catgut. This new strand is the result of post-war research in our laboratories. Its built-in tensile strength is up to 30% greater than in sutures previously produced.

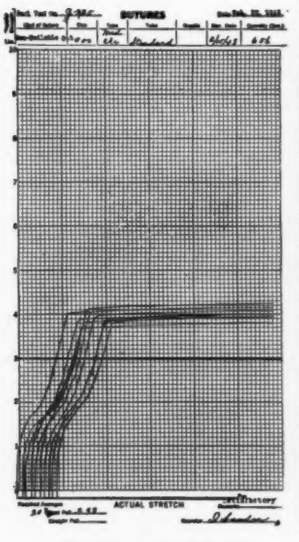
Throughout the length of the strand you have the advantage of this 30% greater strength in Ethicon's new Bonded Catgut.

Throughout the entire strand you are assured uniformity of diameter through Ethicon's exclusive Tru-Gauging Process.

Throughout the full diameter you get thorough, even chrome deposition and controlled digestion, the result of Ethicon's exclusive Tru-Chromicizing Process.

Throughout the strand you get uniform pliability, contributing to easy pull through tissue and trouble-free tying of knots.

Your assurance of 30% greater strength ...proved by Ethicon's daily tests

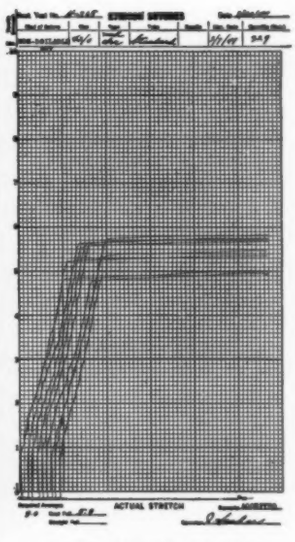


FORMER PRODUCTION

Here's the mechanically-recorded laboratory proof of Increased Tensile Strength in Ethicon's New Bonded Catgut.

These tensilgrams are actual daily strength tests given each lot of sutures. Horizontal red lines at numeral 3 mark U.S.P. requirements for Knot-Pull Strength on Size 00, Non-Boilable Catgut.

Red curves show breaking points. Up to 30% greater strength and uniformity of strength are strikingly demonstrated. Note close grouping of breaking points, which indicates uniformity of product from strand to strand.



CURRENT PRODUCTION

ETHICON *Sutures*

SUPERIOR IN THOSE QUALITIES IMPORTANT TO THE SURGEON

silk and cotton sutures

SILK—Prepared especially for the meticulous demands of the silk technic. You get more intrinsic strength and minimal tissue reaction with Ethicon's Tru-Formed Black Braided Silk Sutures.

Ethicon Silk forms smooth, firm knots. It has minimal adherence to tissue.

Ethicon Silk is non-capillary, serum-proof, non-toxic, and strictly U.S.P. gauge.

Ask your O.R. Supervisor for Ethicon Silk.

COTTON—Ethicon Cotton, U.S.P., is the culmination of exhaustive laboratory and clinical study. It is specially prepared from imported 100% Egyptian long staple fiber. No talcum powder, harsh fillers, or harmful dyes are used. It is free from lint and irregularities.

Tensile strength is 10% to 30% greater than ordinary cotton. *Sizes are U.S.P.:* 5-0, 4-0, 3-0, 2-0, 0, 1 and 2. If you are a cotton man, try Ethicon Twisted Cotton.

ETHICON
Sutures

ETHICON SUTURE LABORATORIES
Division of Johnson & Johnson, New Brunswick, N. J.
World's Largest Manufacturer of Surgical Gut
Suture Laboratories at New Brunswick, N. J.; Chicago, Ill.; Brazil; Argentina; England; Australia

COPYRIGHT 1948, JOHNSON & JOHNSON
PRINTED IN U.S.A.

The American Journal of Surgery

Copyright, 1948 by The Yorke Publishing Co., Inc.

A PRACTICAL JOURNAL BUILT ON MERIT

Fifty-seventh Year of Publication

VOL. LXXVI DECEMBER, 1948 NUMBER SIX

Editorial

Presidential Address

THE PRESENT STATUS OF PROCTOLOGY AS A SURGICAL SPECIALTY IN THE UNITED STATES

GEORGE H. THIELE, M.D.
Kansas City, Missouri

THE specialty of proctology in the United States was born in 1899 with the founding of the American Proctologic Society at Columbus, Ohio. For almost fifty years our members have worked in behalf of our specialty but it is true, nevertheless, that in all probability this Society will celebrate its fiftieth anniversary only as the parent of a subspecialty of general surgery, having failed to produce an independent specialty. We must admit that so far general surgery, foster parent of proctology, has controlled its destiny. The American Proctologic Society is not entirely without blame for this situation.

In three important respects this Society has failed to fulfill its obligations to its members: (1) It has failed in its efforts to obtain an independent Board of Proctology; (2) it has failed to promote and activate an adequate teaching program for the undergraduate medical student, to provide adequate residency training for the graduate student and to provide a broad educational program for the benefit of those general practitioners and surgeons who wish to learn more about proctology; and (3) it has failed to provide adequate opportunities for membership in this Society. Let us consider the first of these failures, namely, the problem of certification through an independent Board of Proctology.

THE AMERICAN BOARD OF PROCTOLOGY

If we are ever to certify an adequate number of proctologists, we must correct the inequalities which now exist in the provisions for the certification of proctologists. The present requirements of the American College of Surgeons and of the American Medical Association make it almost mandatory that a recognized training program be under the direction of a specialist who is a diplomate of an official examining board. It requires no great intelligence to reason that without a Board of Proctology there can be no diplomates, hence no acceptable teachers, hence no students and, therefore, no new proctologists. It is as simple as that.

Therefore, we may properly spend some time considering the reasons why proctology has been unable to attain an independent maturity as have the other surgical specialties and to outline, if possible, the correct procedures to be followed if we are to attain the status of an independent specialty whose members are certified by an independent Board of Proctology.

As a matter of comparison we should review the histories of the other surgical spe-

cialties. I shall first name the specialty board, then give the date of its official approval by the Advisory Board for Medical Specialties and then follow with the number of diplomates as of July, 1947.

The American Board of Ophthalmology, 1917, 2,564; the American Board of Otolaryngology, 1924, 4,000; the American Board of Obstetrics and Gynecology, 1930, 2,137; the American Board of Orthopedics, 1934, 1,042; the American Board of Urology, 1935, 1,136; the American Board of Surgery, 1937, 2,904, of whom only 75 are certified in proctology; the American Board of Plastic Surgery, 1937, 171; and the American Board of Neurosurgery, 1940, 190.

The American Board of Proctology was incorporated in 1935, two years before the incorporation of the American Board of Surgery and immediately applied to the Advisory Board for Medical Specialties for official status as an approved independent Board of Proctology. Our representatives were asked to await the organization and incorporation of the American Board of Surgery and seeing no reason why this request should be refused consented to wait until the American Board of Surgery was approved. However, just as soon as the Board of Surgery was officially approved in 1937 our difficulties began. Even though our incorporation antedated that of the Board of Surgery by two full years the newly approved Board of Surgery maintained that proctology, being a subspecialty of general surgery, was not entitled to an independent examining board. Ever since 1937 proctology has been under the dominance of the American Board of Surgery upon which Board, however, we are not privileged to be represented. Finally, in 1941 we were granted a status subsidiary to the Board of Surgery through the formation of a Central Certifying Committee in Proctology but to this date we have no representation on the Board of Surgery and hence, no voice whatever in the formulation of the rules under which we function. As far as American medicine is concerned the principle of taxation without representation was not abrogated when the Colonies won the Revolutionary War. As matters now stand our diplomates are required to meet higher standards than are required of those of any other surgical specialty including those of the American Board of Surgery itself. Each diplomate of the Central Certifying Committee in Proctology must first pass both examinations of the American Board of Surgery before he is qualified to take the examinations of the Committee. These requirements are imposed upon no other surgical specialty Board.

Let me make our position clear. We are not asking for nor do we want the "bars let down" so to speak. Proctology is a surgical specialty and as such its diplomates should first of all be thoroughly trained surgeons but they should not be required to be supermen. There is no reason why a proctologist should be forced to qualify in surgery of the thyroid or why he should be required to prove his ability to perform a gastric resection any more than should the orthopedist, the urologist or the gynecologist.

You are all familiar with the long-continued efforts which have been made by your representatives who have appeared before the Advisory Board for Medical Specialties with the request that we be granted an independent Board of Proctology. Year after year those representatives have been sent from the Advisory Board to the American Board of Surgery only to be referred back to the Advisory Board. To use a slang expression, we have been the victims of the most artful example of "buck-passing" in the annals of organized medicine. Our efforts have been dealt with on a basis of power politics rather than on one of merit and justice. The Advisory Board for Medical Specialties, composed of representatives of all of the specialties, has become so engrossed in its own problems that it has failed to appreciate the fact that as long as the Board of Proctology is under the dominance of the American Board of Surgery it cannot function efficiently.

Each of you received a copy of the petitions which were presented to the Advisory Board by this Society and by the Central Certifying Committee in February, 1948 outlining our position and our arguments. As a result of those petitions the Advisory Board recommended to the American Board of Surgery "the establishment of a subsidiary or affiliate Board within the American Board of Surgery and that those desiring certification in Anorectal Surgery only be certified in that field without having to take the entire examination in General Surgery, but that those who wish certification in Proctology and Colon Surgery

shall continue to take the examinations in General Surgery as was recommended last year; and in the event that the American Board of Surgery should not wish to accept this recommendation, the Advisory Board further recommended that proctologists and colon surgeons be given an independent Board."

Apparently we have been successful in our efforts to provide for the official certification of those men who wish to limit themselves to anorectal surgery.

We may be sure that the reasons for our failure to obtain an independent Board of Proctology lie in part in our own shortcomings. We cannot remain idle for nine months of the year grumpily contemplating our troubles and expect to attain our objectives. We might just as well make up our minds right now that this job of securing an independent Board of Proctology is a year-around task which is going to require activation of all the latent ingenuity we have. We cannot secure an independent Board by complaining about the attitude of the American Board of Surgery. Boiled down the elements of the situation force us to one conclusion, namely, that we have not welded ourselves into a sufficiently powerful organization to demand and to get what we want. Thus it is that although our representatives have worked since 1932 for an independent Board of Proctology, it has not yet been granted. While hope has grown gray, accomplishment is still only adolescent.

Why is it that the specialty of proctology has been unable to keep pace with the other surgical specialties in the attainment of recognition? The answer is to be found in this Society and in seeking it we are brought face to face with the second of our obligations—that of providing teaching facilities.

TEACHING FACILITIES

Proctologic teaching has not kept pace with the constantly increasing fund of proctologic knowledge. In common with that of the other specialties proctologic teaching includes three phases: undergraduate instruction, postgraduate instruction, postgraduate residency programs and general educational programs through the use of scientific journals and medical meetings.

Undergraduate Teaching. For years this Society has had a standing Committee on Education which has done an admirable piece of work. As part of its activities during the past year it has conducted a survey of proctologic teaching in Class A medical schools of the United States and Canada. Questionnaires were returned by sixty-five schools. This survey has revealed that proctology is being taught in fifty-four medical schools. In thirty-seven of these schools proctologic teaching is under the direction of a proctologist and in eleven schools there is a separate and distinct Department of Proctology headed by a proctologist with the rank of full professor. Questionnaires were not returned by sixteen schools, in seven of which it is known that proctology is being taught.

We must, therefore, follow up the work which has been done by our Committee on Education. In every city in which a Class A medical school is located one of our certified members should contact the Dean of that school and make every effort to initiate some kind of proctologic teaching if only the conducting of an out-patient clinic. It is a foregone conclusion that such a clinic will grow rapidly and will soon demand hospital surgical service. Increasing demands will eventually result in the organization of departments of proctology either independently or as divisions of the departments of general surgery. As a result of proctologic teaching some medical students will be attracted to our specialty. We should, therefore, make provisions for residency training programs.

Resident Training. Men who are associated with hospitals which provide acceptable resident training must provide proctologic training for residents. As of August 16, 1947, as published in the J. A. M. A., postgraduate proctologic training is limited to the facilities provided by only eleven different hospitals for thirty-four residencies and assistant residencies. In addition to the graduate teaching facilities provided by these residencies there are facilities provided by a few privately conducted short courses in several different localities and refresher courses by a few university medical schools.

Although forty-three different cities are represented by the diplomates of the American Board of Surgery in Proctology through the Central Certifying Committee, resident training is available in only eleven different cities. This means that thirty-two additional residencies could be instituted. The solution is

obvious. The conclusion is that we are simply not working hard enough to provide proctologic resident training in our own institutions.

General Educational Program. The scope of the educational program of this Society must include some provisions for the great mass of medical men who do not hope to qualify as certified proctologists but who have developed an interest in proctology, who have not had available training in medical school or as postgraduate students and who wish to improve the quality of proctologic practice which they are doing as general practitioners and surgeons. To this group of men we owe a distinct obligation and by raising their standards we shall raise the general status of our specialty. This field offers perhaps our greatest chance to make ourselves heard in American medicine.

My suggestion for a solution of this problem is that a subcommittee on curriculums be appointed to serve as a part of the committee on education. The members of this committee should be men who have been actively engaged in teaching proctology. This committee's duty should be to formulate an official course of study for the instruction of those interested in proctology. Teaching facilities should then be set up by this Society in approximately twenty-four cities throughout the country. The men within these areas can then be assigned the uniform course of study and can congregate once a month at these teaching centers for sessions with a diplomate of our board or with a fellow of this Society. Wet clinics can be held. At the end of two years of such supervised study it might be desirable to grant a certificate of some type after the examinee has passed a suitable examination formulated by the committee on curriculums. Thus the seeds of proctology can be broadcast.

I realize that this is a big program. Big tasks, however, demand big programs. Every privilege which we enjoy is conditioned upon a responsibility; if we are to have the privilege of seeing proctology attain what to us seems its rightful place, we must accept the responsibility for some such teaching program.

Medical Meetings and Scientific Papers. There is one more important way in which we can demonstrate to the medical profession our right to the status of an independent specialty. This is by the exercise of extreme care in the presentation of scientific papers before county, state, regional and national medical societies. Nothing else will so quickly sound the death knell of the specialty of proctology as the publication of a mass of poorly written papers on time-worn subjects about which recent textbooks supply all of the authoritative information. Textbooks are written for just that purpose. I think we may use the subject matter of this meeting as a fair example. I believe that the papers presented at this meeting will go far in demonstrating to the surgical profession of this country that proctology has outlived its growing-pains and has at last reached a maturity where it may be expected to produce enough well trained proctologists to fulfill the need which exists. For the benefit of the younger men whose experience in medical writing is necessarily limited I believe that we should provide a consulting editorial committee to which they can submit ideas they may have about proposed scientific papers and whose help will be available in the composition and preparation of such papers.

MEMBERSHIP

The problem of membership in the American Proctologic Society has become one of increasing importance both to the applicants and to our Society. At this meeting we are entertaining as guests about 200 young men who because of their interest in proctology have requested guest cards. We are particularly glad to have these men with us but the problem of selection and of acting upon the applications for membership has become an increasingly difficult one. Your council has just spent the greater part of three days carefully investigating every one of these 200 applications for membership. The task has become too great to be assumed by such a small group. While the chance for error is small, I believe it is still too great. Not a single applicant should be done an injustice.

I suggest, therefore, that we divide the country into twelve zones and that a regional membership board be established in each zone. Such an arrangement will permit each of these boards an almost personal contact with its applicants for membership. Reports from regional boards may be made to the council and recommendations from the council made directly to the fellowship.

COMPONENT SOCIETIES

There are now eleven organized proctologic societies in the United States. This is a very

healthful trend. No tree is any stronger than its roots. I would strongly advise, therefore, the organization of more local, state and regional societies and would further recommend that when such societies have been organized membership in the American Proctologic Society be contingent upon prior membership in one of these secondary organizations. This will help to provide the solution of the problem of selecting the membership of this Society from the applicants.

CONCLUSION

I have considered only a few of the more important problems pertinent to the present status of American proctology and have suggested what seem to be the obvious solutions. One fact is certain: The Society must make a more concerted and sustained effort to improve our present situation or be forever content to remain as we are now, a step-child of general surgery and a half-brother to the other surgical specialties. Our situation is not hopeless. It can be improved and we can secure an independent Board of Proctology. The task is ours; we should carry on and accomplish it.

Since this editorial was written the secretary of the Central Certifying Committee in Proctology has been advised through a letter dated June 9, 1948, from Dr. J. Stewart Rodman, secretary of the American Board of Surgery, that the Board of Surgery decided at its annual meeting that it "could not accept the recommendation made by the Advisory Board to the effect that for one group, those wishing to practice ano-rectal surgery only, a special examination be arranged so that they would not have to pass the same examination in general surgery that has been required in the past."

This should mean that proctologists will be given an independent American Board of Proctology after complying with the requirements of the Advisory Board for Medical Specialties in the essentials and organization of such a Board.

Papers of the Scientific Sessions

COLLOID ADENOCARCINOMA INVOLVING THE PERIANAL REGION, ANUS, RECTUM OR SIGMOID COLON

JOHN R. HILL, M.D. AND NEWTON D. SMITH, M.D.
Section on Proctology, Mayo Clinic
Rochester, Minnesota

IN our work in the Section on Proctology at the Mayo Clinic we have observed that some colloid adenocarcinomas present peculiar diagnostic problems. These problems are more serious and more difficult than those presented by adenocarcinoma in which colloid material is not observed. Other physicians also have had difficulty in making the diagnosis in cases of colloid adenocarcinoma of the distal part of the intestinal tract. Although this problem does not arise frequently, we proctologists must recognize it and contribute more to its satisfactory solution because failure to solve it carries an increased hazard for the patient.

MATERIAL STUDIED

Thirty-eight cases of colloid adenocarcinoma in the perianal region, anus, rectum or sigmoid colon have been selected to illustrate our observations. We studied 321 cases but this smaller group of cases (11.8 per cent of the total group) illustrates best the problem we are anxious to present. In most of the other cases the diagnosis was made more promptly and without much difficulty because of the clear cut gross pathologic picture. All except one of 321 patients were examined sigmoidoscopically. The one exception had an extremely painful anorectal lesion, presumably an epithelioma.

OBSERVATIONS

The proportion of males to females in our group of thirty-eight was not unusual; there were twenty-five males and thirteen females. The age distribution, however, are unusual. Whether this would maintain in a much larger group may be doubted but still it is peculiar in this group and worthy of attention. Eleven of the thirty-eight patients were less than forty years of age and of these, six were less than thirty years old. Nine of the patients were in the fifth decade of life, eleven in the sixth, four in the seventh and two in the eighth decade.

Rankin and Chumley[1] observed that colloid adenocarcinoma appeared most frequently in the rectum, rectosigmoid, cecum and ascending colon. Because the lesions appear most frequently in the most distal portion of the colon, it might seem that the patients would observe symptoms early and, therefore, seek medical advice promptly. This was only approximately true in our group of thirty-eight patients. Twenty-one were examined during the first six months after the onset of the symptoms and eight in the second six months. The colloid adenocarcinomas of four patients occurred in fistulas which had been present for twenty, eighteen, sixteen and two years. In the case in which the fistula was of only two years' duration the malignant lesion could have been present when the first symptoms were noticed but in the other three cases it seems permissible to conclude that the malignant lesion occurred in a fistula. This is further proved by the history obtained from each of the three patients. Each had observed increased activity and also a variation in the response of the tissue to the therapeutic measures which previously had relieved the discomfort.

Diagnosis of colloid adenocarcinoma involving the perianal region, anus, rectum or sigmoid colon is often delayed because the lesion may simulate a benign or inflammatory pathologic process. In thirteen of our patients the colloid adenocarcinoma resembled a benign

stricture and only after the removal of a satisfactory specimen for microscopic examination was the correct diagnosis possible. Seven of the lesions resembled anal fistulas or wounds which usually result from fistulectomy. Five of the colloid adenocarcinomas closely resembled diverticulitis when observed proctoscopically and disclosed the malignant nature of the lesion only at the time of surgical abdominal exploration or colostomy to relieve the obstructive symptoms. Four of the patients had rectovaginal masses which resembled abscesses or benign lesions and three had ulcerative lesions involving the anus. An ulcerative lesion in the rectum of one patient was diagnosed as a tuberculous ulcer and another patient was treated for chronic ulcerative colitis. Two of the patients had lesions which appeared peculiar and no diagnosis was attempted until the pathologist had the opportunity to examine a specimen removed at the time of proctoscopic examination.

Two patients had colloid adenocarcinoma (Broders' classification), grade 3, closely associated with an adenocarcinoma, grade 1, in which colloid material was not evident. In another case a squamous cell epithelioma of grade 1 and a colloid adenocarcinoma of grade 4 were observed. Still another patient had a low grade 1 papillary adenocarcinoma in which colloid material was not evident associated with a colloid adenocarcinoma of grade 4. An adenoma was also observed in the sigmoid colon of a patient who had a colloid adenocarcinoma, grade 3, of the rectum. These observations concur with those made previously by others that a colloid adenocarcinoma frequently is not a lesion with a homogeneous growth of cells. Some of the lesions may appear to be non-colloid adenocarcinoma in one portion and pure-colloid adenocarcinoma in another.

The imperative need for prompt, accurate observation and evaluation of findings is impressively illustrated when we consider the following brief summary of pertinent information. During the undoubted presence of the colloid adenocarcinoma six of the thirty patients underwent hemorrhoidectomies and two had fistulectomies. One patient's anus was dilated during this important period. Local excision of a tumor was accomplished in another case and roentgen therapy was employed in one case. It is true that the last two patients had been treated for the serious lesion but in the presence of a colloid adenocarcinoma such treatment is never satisfactory. One other patient was examined by several physicians all of whom detected a pelvic mass but by the time operation was attempted, the lesion had become inoperable.

The seriousness of this lesion is illustrated by the fact that seventeen (45 per cent) of the thirty-eight patients were dead in less than a year after the diagnosis was made. Six died during the second year, seven during the third year, three during the fourth year and one during the sixth year. One patient lived twelve years after the diagnosis of colloid adenocarcinoma but ultimately succumbed to the carcinoma. One patient is still living three years and ten months after operation. One patient was apparently cured but died in an accident and another is still living fourteen years after fulguration of the involved region. Another patient is still living after having undergone palliative surgical measures. Two of the patients have not been accounted for but both presumably have succumbed to the colloid adenocarcinoma because one refused surgical intervention in spite of the fact that he had an extensive lesion and the other at the time of posterior resection proved to have a colloid adenocarcinoma, grade 3, with involvement of the entire thickness of the wall and adjacent glands.

A brief review of the treatment employed in this group of cases gives material for a plea not only for radical surgical procedures but for their accomplishment early enough to save lives. It is unreasonable to temporize or be timid in view of the facts. If it can be assumed that posterior resections, anterior resections, abdominoperineal resections and a Harrison-Cripps operation were all done with curative intent, twenty-three of our patients were treated with cure in view. Eleven were treated by colostomy or other palliative treatment and five were treated by the application of radium only after surgery. Fulguration was employed in two cases.

Another fact that impressed us was that colloid adenocarcinoma in the perianal region, anus, rectum or sigmoid colon invaded directly into surrounding tissue. A specimen removed for biopsy from the margin of the lesion, therefore, may show only inflammatory reaction and unless another satisfactory specimen is

promptly removed, much valuable time may be lost. If any lesion in this portion of the body is suspected of being malignant and the pathologist's report fails to confirm this suspicion, another specimen should be obtained promptly.

COMMENT

We would like to reiterate that colloid adenocarcinoma in the perianal region, anus, rectum or sigmoid colon is more serious than is frequently recognized. To save the lives of patients afflicted with this lesion earlier diagnosis must be accomplished and surgical intervention must be radical even when it is attempted early. No other form of treatment seemed to help except fulguration in two cases. Because of the anorectal surgery that was accomplished during the presence of the colloid adenocarcinoma, it seems inexcusable for any surgeon to operate on any anorectal pathologic process before a proctoscopic examination has been accomplished. Colloid adenocarcinoma in the regions mentioned may simulate other lesions less dangerous but this masquerade must be recognized early if a greater number of lives are to be saved than are saved at present.

REFERENCE

1. Rankin, F. W. and Chumley, C. L. Colloid carcinoma of the colon and rectum. *Arch. Surg.*, 18: 129–139, 1929.

DISCUSSION

John D. Charles (Milwaukee, Wis.): My comments will only underline the unfavorable prognosis that Dr. Smith has had to insinuate.

With the help of my resident staff at the Milwaukee County Hospital we hurriedly went over the cases for the last ten years and found twelve cases involving the rectum and rectosigmoid, eleven of the rectum and one of the rectosigmoid. Five of these had surgery that was intended to be curative, one had palliative surgery and they are all dead.

In addition, there was one lesion of the cecum, one of the ascending colon, and two of the splenic flexure. One of the cases of the splenic flexure still survives, and, incidentally, there were six cases of gastric colloids all of whom had an early demise.

I shall just review one or two basic matters in connection with diagnosis and what the pathologic significance of colloid adenocarcinoma may be.

It seems that there are two types of colloid adenocarcinoma, one of which is primarily a collection of the mucinous material extracellularly and is relatively a benign disease. The fact that it is a benign disease may be deceiving, however, because often certain parts of the tumor do form the more malignant or intracellular colloid type. This latter type is the type that is characterized by the so-called signet ring or goblet cell, with compression of the nucleus to a crescent or crescent-like shape. It is uniformly of highly malignant character.

It strikes me as particularly pathetic that each time a paper is given on the subject of malignant disease, it is concluded by some sad remark to the effect that more sigmoidoscopic examinations should be done and that many of these people are inadequately diagnosed. I would think that this organization should be the one that should exercise some more forceful attempts at bringing this problem to the attention of the general medical profession, surely, but perhaps even to the laiety through some such medium as the Cancer Society, or however the Council of this Society might see fit. That, however, is a problem for the men who lay down the principles and policies of this association and I present it purely as a suggestion. Thank you! [Applause]

Rufus C. Alley (Lexington, Ky.): Colloid adenocarcinoma or mucoid or gelatinous carcinoma can be a confusing tumor, as Dr. Smith so well pointed out, especially from the diagnostic point of view. Dr. Smith and Dr. Hill have given us an excellent résumé of this subject and have enumerated some of the more easily made errors that might be encountered in diagnosis.

Modern treatment of cancer of the large bowel offers the patient excellent prospects of cure provided diagnosis is established early and treatment instituted promptly. Today early and accurate diagnosis is the most important single step in the cure of cancer.

The differential diagnosis of colloid carcinoma is important and often difficult. As the essayists have indicated, it may easily be confused with benign stricture of the rectum, benign tumors or inflammatory lesions. Histopathologic studies by skilled pathologists are essential for accurate diagnoses.

In this connection I should like to emphasize the desirability of removing, when feasible, multiple biopsy specimens during the first examination. In many instances I have found it expedient to remove as many as five or six biopsy specimens from different parts of the same tumor during one session.

Probably most of you have had the same experience, as I, of taking a single biopsy specimen from a tumor that you believe perfectly sure is cancer and have the pathologist report, "inflammatory tissue," or, "no evidence of cancer." Then it is necessary to get the patient back and repeat the examination and the biopsy removal, and this can be done three or four times or more before the right part of the tumor is sampled. Cancer has a way of

producing an extension of inflammatory granulomatous tissue that is difficult or virtually impossible to distinguish by gross appearance through the sigmoidoscope, so on numerous occasions I have removed multiple specimens.

The pathologist will usually block the specimens in a group very much like the petals of a flower and make sections through all of the biopsy specimens. That gives him much more representative areas of the tumor for study, his findings are much more likely to be accurate and his opinion concerning the nature of the growth is therefore more valuable. I have done this numerous times and I have never yet had occasion to regret it. I have not encountered any complications, excessive bleeding or any other undesirable sequelae. This also relieves the patient of the necessity or rather the inconvenience of repeated preparation and examination.

I want to ask a question. Dr. Smith stated in conclusion that in four of thirty-eight patients, which is a little more than 10 per cent of these patients that he studied, the colloid cancer occurred in fistulas. I should like to ask if this high percentage applied to his entire series of 321 cases or whether it applied just to the thirty-eight cases that were selected for study.

N. D. Smith (closing): I am sincerely grateful for the manner in which Dr. Charles and Dr. Alley have augmented my original discussion. To answer the question that was asked concerning the colloid carcinomas which occurred in fistulas, I may say that these particular cases have been reported elsewhere. Three fistulas were seen and the patients afflicted with them were observed over a long period. So far as I know, the lesions are the only carcinomas that have occurred in fistulas while the patients were under our observation.

I should like to emphasize the fact that possibly we become a little tired of talking about the importance of sigmoidoscopic examination, but I believe it is only by continued talking that we can ever impress others with the importance of such a procedure. This method is probably the only one we have at the present time by which we can carry on any preventive medicine in the form of discovering lesions early enough to insure their removal and cure.

For emphasis, I should like to call your attention again to the fact that our interest in this group of patients was aroused because we had difficulty in making diagnoses. The patients frequently were referred to us because they supposedly had benign strictures. Grossly, such appeared to be the case. Since, however, we were puzzled by the persistence of the lesion and the late appearance of it, we were of the opinion that we needed to study tissue removed directly from the lesion itself. I think it is still important to remember the mimetic features of the lesion. In the future, colloid carcinomas must be excised radically without attempts to save tissue. Realization of this fact is important because radical excision presents the only means of assuring cure since the lesion tends to spread more rapidly into the surrounding tissue than do other types of adenocarcinoma. Simple excision in fact rarely accomplishes much good.

CHOICE OF OPERATION IN CARCINOMA OF THE LEFT HALF OF THE LARGE BOWEL

RAYMOND W. MCNEALY, M.D. AND FRANCIS D. WOLFE, M.D.
Chicago, Illinois

THE consummate aim of each operation for carcinoma of the large bowel is to remove completely the tumor and adjacent tissues that might be involved. Immediate or delayed restoration of bowel continuity and sphincter control should be provided when possible but under no circumstances should one sacrifice completeness of dissection and resection in order to preserve sphincter control or avoid permanent colostomy.

In those portions of the left half of the large bowel that are easily accessible a wide resection with primary anastomosis is unquestionably the most desirable operation from the patient's standpoint. There are definite limitations, however, to use of this type of operation. It should never be employed unless the patient has had satisfactory and complete preoperative preparation. Even a mild degree of obstruction and consequent distention are contraindications to use of the operation. Retention of barium in the colon following previous roentgenologic examination makes primary anastomosis extremely hazardous.

If the bowel can be thoroughly decompressed by enemas, chemical biostatics will be given an opportunity to reduce the bacterial flora to a level compatible with primary healing and firm union of the cut ends of the colon. In addition to the local factors concerned in healing we have learned that the protein levels of the blood, the vitamin level and liver efficiency play a very important rôle.

There are certain mechanical and technical factors which must be observed. An adequate blood supply can usually be assured if one is careful to divide the mesentery in a manner that will not impede the free flow of blood to the cut ends of the bowel. The practice of crushing these ends which are later to be used in the anastomosis is unwise and unsafe. The anastomosis should be made with fine, interrupted sutures which accurately approximate each layer of the bowel wall. It has been our practice to use fine, non-absorbable sutures. Delayed diaphragm stricture formation is more likely to develop when a continuous suture is employed and if excessive inversion is accomplished at the site of anastomosis. When anastomosis is performed below the promontory of the sacrum, only one row of through-and-through, interrupted, non-absorbable, fine suture material is used on the posterior wall; while the ends and anterior wall are reinforced with a second row of Lembert sutures.

If the patient has been prepared properly, postoperative management offers few difficulties. The stomach and small bowel are maintained in a state of decompression from eight to ten days by utilizing an indwelling nasal suction tube. The large bowel is prevented from becoming distended by the use of a retained, short rectal tube. It is important to see that the tube is kept patent at all times and we have accomplished this by introducing a small amount of air through the tube with a bulb syringe. This is done every three hours.

We insist that no patient who is to undergo a bowel resection be brought to the operating room unless he has had a fluoroscopic examination on the preceding day. If there is any evidence of barium or fecal material in the colon, the operation is postponed until the bowel is emptied of its contents.

There are certain cases which do not lend themselves to resection followed by primary anastomosis. Patients who have remained obstructed until their condition has assumed emergency proportions may require some type of immediate colostomy. This is particularly true if the proximal portion of the obstructed colon contains masses of feces or barium.

Almost everyone is familiar with the problem of decompressing the large bowel between the ileocecal valve and the left-sided lesion which produces complete obstruction. Nasal suction may empty the small intestine but the large bowel is more difficult to decompress. Fortunately, completely obstructive lesions are usually found in the lower portion of the sigmoid and upper part of the rectum. We have had considerable success with these patients

after the lower bowel has been cleansed by repeated enemas and after a proctoscope has been inserted carefully. In a number of instances we were able to pass a small catheter beyond the obstructing lesion. After distention was relieved we employed gentle irrigation of the large bowel proximal to the tumor and often were able to liquefy the contents and facilitate evacuation in that manner.

We oppose the employment of the Mikulicz procedure when the patient's condition is complicated by distention of the colon. Handling of the tumor and mobilization of sufficient bowel on either side of the lesion to permit the exteriorization is an extremely difficult task. There is always danger of leakage and the attempt to "double-barrel" the large bowel on either side of the lesion adds greatly to the risk. When sutures are placed in the distended, thin-walled, large bowel, the procedure carries great risk. We have employed the Mikulicz procedure only once in 266 consecutive operations for tumors of the large bowel.

The proper location of the colostomy cannot be overemphasized. Every effort should be made to determine the position of the obstructive lesion before colostomy is performed and the colostomy should be placed where it will facilitate subsequent operations. We are not enthusiastic about resections and primary anastomosis in the case of lesions situated at or very near the peritoneal reflection. When one attempts removal of tumors which are situated too low down, there is a tendency to sacrifice thoroughness for convenience.

Carcinomas located at or near the peritoneal reflection and those below this level belong to a group that are probably best managed by a one-stage, abdominoperineal resection. If a significant degree of obstruction exists, a primary colostomy is necessary. The abdominoperineal operation is similar to a panhysterectomy and is designed to facilitate wide excision of the pararectal tissues and mesosigmoid. If the one-stage resection is performed, the surgeon should be thoroughly familiar with the anatomic structures with which he has to deal. Dissection should be boldly but carefully executed. As much of the sigmoid and its mesentery as possible should be removed but sufficient bowel should be preserved to permit the establishment of a colostomy without tension.

The advantages and indications for the various types of sleeve resections and so-called pull-through operations vary greatly with different surgeons. Briefly, it may be said that these operations are predicated on the belief that the direction of spread in carcinomas of the rectum is predominantly in an upward direction.

The advantages derived from surgical procedures in which a perineal-anus is established are: (1) the normal location of the stoma is more satisfactory; (2) a certain amount of sphincter control is preserved; (3) a smaller percentage of impotencies result than following other procedures.

In our series of 266 consecutive cases no leakage or fistulas have developed. The follow- procedures were used:

Type of Operation	No. of Cases	Per Cent
Permanent colostomy	18	6.8
Abdominoperineal	188	70.6
Primary anastomosis	50	18.8
Mikulicz	1	0.4
Treatment refused	9	3.4
Total	266	100

Even when metastases exist, we have employed colostomy alone less and less frequently. We have expended great effort in many instances in removing the primary tumor despite the presence of metastases. We believe that this is justifiable because it delays local extension and spread; extension to ureters, prostate, bladder and sacrum is less troublesome than when the tumor is left in place and a colostomy alone performed. No effort is made to resect the primary tumor when there is serious involvement of adjacent pelvic structures.

CONCLUSIONS

We have tried to adapt each operation to the requirements of the individual patient. Complete excision of the primary tumor with wide excision of the surrounding gland-bearing tissue has been our chief objective when operating upon resectable lesions of the colon. Reconstruction of the continuity of the bowel and preservation of sphincter control has been regarded as of secondary importance despite its desirability.

SURGICAL MANAGEMENT OF LESIONS OF THE LARGE BOWEL

HARRY E. BACON, M.D. AND GEORGE D. VAUGHAN, M.D.
Philadelphia, Pennsylvania

THE management of disease processes involving the large bowel and particularly its distal portion has been the subject of considerable discussion during the past decade. Our interest has centered chiefly with malignancy of this site. In a personal series of 800 patients with cancer the distribution was as follows: sigmoid, 112; rectosigmoid, 261; rectum, 406; and anal canal, 21.

TABLE 1
RESECTIONS

Type of Resection	No. of Cases	Deaths	Mortality Rate
Sigmoidectomy—multiple stage—Mikulicz-Rankin	38	3	7.8
A. Sigmoidectomy—single stage—open or closed	34	3	8.8
Sigmoidectomy—single stage—Hartmann	18	2	11.1
B. Abdominoperineal proctosigmoidectomy without colostomy and with preservation of sphincter musculature	401	20	4.9
Abdominoperineal excision—one-stage Miles	110	3	2.7
Abdominoperineal excision—two-stage Lahey	7	1	14.3
C. Colostomy and perineal excision Lockhart-Mummery	26	1	3.8
Perineo-abdominal excision Gabriel-Turner	2	0	0
Perineal resection Cuneo-Seneque	2	0	0
	638	33	5.1%

It has been our custom to estimate the rate of resectability on the total number of patients with neoplastic disease; whereas if calculation is made on the basis of the number operated upon as suggested by Pemberton,[28] Jones[22] and Babcock,[1] our resectability rate would be 88.0 per cent.

Our approach to the management of malignancy of the lower portion of the bowel may be described as follows: (1) All growths involving the mid and proximal sigmoid are removed by immediate establishment of intestinal continuity either by the open or closed technic, or the Mikulicz-Rankin method of exteriorization; (2) all lesions involving the distal sigmoid, rectosigmoid and ampullary portion of the rectum are extirpated by proctosigmoidectomy without colostomy and with preservation of both the internal and external sphincters; (3) those lesions involving the anal canal and lowest 3 cm. of the rectum are excised by methods in which the sphincter muscles are sacrificed and a permanent abdominal colostomy established. The technic usually chosen is the Miles abdominoperineal method of excision.

The types of resection employed in the treatment of the 800 patients with malignancy of the lower bowel is shown in Table 1.

It will be noted that 76 per cent of the resections were performed without permanent colostomy and 69.6 per cent without any type of colostomy. The number of patients in our series on whom primary anastomosis was performed is small and the survival rate after five years cannot be determined. However, it is known that 52.6 per cent of the patients upon whom an abdominoperineal proctosigmoidectomy was performed were living five years or more following operation.[8] It should be stated that this group includes those patients upon whom palliative as well as non-palliative (curative) procedures, both favorable and unfavorable, were employed.[7] As has been reported elsewhere[11,12] the incidence of local recurrence in our series was 17.9 per cent.

Benign Polypoid Lesions of the Sigmoid. During the past few years an earnest attempt has been made to determine the most satisfactory procedure for the removal of solitary benign polypoid growths situated in the colon above the peritoneal reflection. Previously it had been our custom to remove such a lesion

by utilizing an electric snare and applying it through the sigmoidoscope. Until the time of this report our series included fifty-three patients in whom sigmoidotomy was performed. In several instances the polyp was visualized by endoscopic means. In other cases the growth was visualized by roentgenologic studies by employing the double contrast enema technic. During the performance of sigmoidotomy the abdomen is opened through a modified Cherney or Babcock diagonal incision, the sigmoid is slit through the taenia after precise measurement and the growth is removed between clamps which are applied at the base. The stump is inverted by employing a Cushing stitch. Through the incision a sterile sigmoidoscope is passed both proximal and distal in order to determine whether or not additional lesions are present. Following closure of the bowel streptomycin and penicillin are placed in the peritoneal cavity and a slump drain is introduced and allowed to remain in place for forty-eight hours. It is particularly interesting that of the fifty-three patients subjected to sigmoidotomy, twenty-seven or 50.9 per cent of the polyps were reported as grade 1, or grade 2 adenocarcinomas on serial section. There has been no evidence of recurrence to our knowledge. Customarily all patients are sigmoidoscoped and roentgenographed at six-month intervals. There were two deaths (3.7 per cent) early in our experience and both were due to pulmonary embolism.

Chronic Ulcerative Colitis. The rôle that surgery should play in the treatment of this devastating disease continues to be a problem born of disunity and uncertainty. It is difficult for any group of specialists, whether they are gastroenterologists, allergists, exponents of psychosomatic theories, colonic surgeons or those who favor the surgical procedure of vagotomy, to rationalize sanely and arrive at an appropriate conclusion regarding the management of chronic ulcerative colitis. We have been impressed particularly by the statement of Kiefer and Jordan[23] that the medical treatment of chronic ulcerative colitis must be regarded as a control and not a cure and further that the only actual cure now available is complete colectomy. As reported by Lahey[24] and Ferguson,[19] there is evidence at hand to prove that the mortality rate following medical management is approximately the same as that which follows surgical treatment. In the light of our present knowledge surgical treatment must be considered a means of preserving life when acute sepsis is present and as a measure intended to rehabilitate those who are chronic invalids. It is our opinion that a thorough appraisal should be made of the condition of patients suffering with this disease and that they should be placed on a rigid medical regimen. Ileostomy should be performed whenever the condition is not amenable to this regimen because of sepsis and the course of the disease is characterized by remissions and exacerbations with uncontrollable diarrhea, impending perforation, chronic debilitating malnutrition and anemia. Whether or not hemorrhage warrants ileostomy is a moot question since we have all experienced at least one instance in which failure occurred.

Colectomy should be stressed for patients upon whom an ileostomy has been performed and who present signs and symptoms of persistent sepsis, extensive scarring of the bowel, fibrous stricture, pseudopolypoid and malignant degeneration as well as arthritic changes. Obstruction calls for surgical decompression but when dealing with peritonitis associated with acute perforation, it may be well to employ "watchful waiting" with Ochsnerization, intestinal intubation and especially antibiotic and chemotherapeutic measures.

Our experience has been limited and in no way compares with that indicated by the reports of others. In a series of 227 patients with chronic ulcerative colitis ileostomy was performed in nineteen instances, either as an elective or an emergency procedure and four deaths resulted, a mortality of 21 per cent. There were ten total or partial colectomies without a death. In each case the rectum was removed.

Diverticulitis. There is common agreement that a good proportion of patients suffering with diverticulitis will respond to non-surgical management. Also, there is little diversity of opinion that the complications of this disease require surgical intervention. Among these complications peridiverticular abscess, perforation, fistula and obstruction may be mentioned. It is often impossible to distinguish between malignancy and diverticulitis. Therefore, exploration under such circumstances is justifiable.

It is recognized that establishment of a stoma proximal to the involved segment of

bowel is followed by symptomatic improvement which occurs as a result of subsidence of the inflammatory process. This amelioration of symptoms may be temporary and of varying degree. The desire of patients for closure of the colostomy often becomes a troublesome problem and it is frequently difficult to convince them that closure should be postponed. Certainly several months should be permitted to elapse before closure is contemplated. During this period irrigation through a completely inactivated bowel should be instituted and antibiotic and chemotherapeutic measures employed.

TABLE II
SURGERY IN CHRONIC ULCERATIVE COLITIS

Author	Ileostomy	Mortality, Per Cent	Ileosigmoidostomy	Colectomy	Mortality, Per Cent
Cave[15,16,17]	65	18.0	11	55	10.9
Cattell[14]	145	18.0	..	121	20.8
Garlock[15,20]	15	13.3	6	16	18.7
Idem[21]	38	15.7	21	46	10.8
Bargen and Pemberton[13]	130	26.9	20	30	36.3
McKittrick[26]	54	27.7	..	10	10.0
Rankin[18,29]	26	31.7			
Lemmer[19,25]	17	23.5	4	11	18.0
Ferguson[8,19]	14	?	..	9	?
Wangensteen[32]	...	....	..	13	none
Ault[33]	6	16.6	..	13	15.3
Bacon[34]	19	21.0	..	12	none

Unfortunately no definite criteria exist by which one may determine the precise time when closure should be effected or when there is no danger that recurrence of symptoms will develop. Ordinarily closure may be reasonably safe after the patient has been completely symptom-free during a period of several months and regression of the process with restoration of bowel continuity has been observed by roentgenologic and sigmoidoscopic examination. It is worthy of mention that in Pemberton's series[27] satisfactory relief followed closure of the colostomy in less than one-third of the patients.

Removal of the diseased segment of bowel is indicated when symptoms recur following complete proximal defunctionalization despite the use of sulfonamide and antibiotic therapy. Also resection should be performed when a fistula exists or when malignancy is suspected. While patients with sigmoidal diverticulitis and its concomitant complications must be studied individually since no single procedure can be selected arbitrarily to suit the requirements of every case, the exteriorization operation designed by Mikulicz and modified by Rankin will be found applicable in most cases. During the past decade there has been a definite trend toward resection and immediate establishment of continuity. While such an operation alone serves to eliminate much of the invalidism associated with multiple stage procedures, there is seldom an instance in which it can be employed without risk unless defunctionalization has been instituted previously.[6] In our series of 104 patients with diverticulitis thirty-two were subjected to operation.[5] Resection was performed in twenty-one instances. Proximal colostomy of the defunctionalizing type (Wangensteen[31] or Devine[18]) was usually established at a suitable time prior to resection. Six operations were performed by the exteriorization method of Mikulicz, three by abdominoperineal proctosigmoidectomy and six by resection followed by end-to-end anastomosis. Sigmoidectomy with permanent colostomy and extraperitonealization of the closed rectal stump (Hartmann technic) was instituted in six patients. Partial cystectomy was required in four instances. The only death in this group occurred as a result of peritonitis following resection and end-to-end anastomosis.

Hemicolectomy and Proctosigmoidectomy with Transplantation of the Transverse Colon to the Anus and Preservation of the Anal Sphincter Musculature. During the past few years we

have examined a number of patients who have refused colostomy or had had a colostomy established either as a part of an abdominoperineal excision or for some other reason. In thirty-three patients we have either anastomosed the colostomy to the extraperitoneal-

TABLE III

Operation	No. Cases	Death	Mortality, Per Cent
Exploration only	1	0	0
Colostomy for obstruction	5	1	20
Incision and drainage of abscess	3	1	33⅓
Drainage for perforation without closure	2	0	0
	11	2	18.1

ized rectal stump which remained following a Hartmann operation or have transplanted the colostomy to the internal anal margin. There were no deaths in this group. An unusual surgical procedure is a left hemicolectomy and proctosigmoidectomy followed by transplantation of the transverse colon to the internal anal margin. Preservation of the anal sphincter muscles is accomplished by this operation which is performed as a one-stage procedure. While limited in its applicability, it has served its purpose well in eleven cases eight of which have been reported previously.[10] The conditions for which the operation was performed included polyposis, extensive diverticulitis with stricture formation, malignancy, ulcerative colitis and malignancy and extensive inflammatory stricture of the rectum and left colon. There were no deaths in the eleven cases. The average period of hospitalization for ten of the eleven patients was 14.2 days; two and a half months was the average time which had elapsed when they returned to work. In no instance was difficulty encountered with viability of the transplanted bowel.[9]

Endometrioma. There were three instances of endometrioma of the rectosigmoid diagnosed following operation and are mentioned because of their apparent rarity. Two patients survived proctosigmoidectomy but one developed uterovaginal fistula one year later which was corrected. In the third, resection with end-to-end anastomosis was successfully performed.

Inflammatory Rectal Stricture. Our experience with inflammatory stricture, particularly of lymphogranulomatous venereal origin, has been made possible through the facilities

TABLE IV

Type of Resection	No. Cases	Death	Mortality, Per Cent
Exteriorization (Mikulicz)	6	0	0
Abdominoperineal proctosigmoidectomy	2	0	0
Abdominoperineal proctosigmoidectomy with hemicolectomy	1	0	0
Resection followed by primary end-to-end anastomosis	6	1	16.6
Anterior resection with colostomy and exteriorization of closed rectal stump (partial cystectomy in four)	6	0	0
	21	1	4.7

offered by three Philadelphia hospitals situated in densely populated colored districts. During the thirteen-year period from 1932 to 1945 11,134 patients with various manifestations of this disease have been examined. Of this number 704 had stricture of the rectum. Ample opportunity was afforded for use of various forms of treatment but even as early as 1938 it was realized that the most satisfactory treatment for rectal stricture was surgical extirpation. Because of the concomitant perirectal infection, a two-stage operation which consisted of colostomy and later perineal excision (Lockhard-Mummery) was found to be the procedure of choice. There were fifty-one of these patients twenty-four of which were reported previously. A loop colostomy was performed in all and the distal loop was irrigated daily. Following a period of three to nine months a perineal excision was performed. Although there was only one death in this group of patients (mortality 1.9 per cent), the morbidity was marked.

Surgical management of inflammatory rectal stricture has become somewhat altered in our hands during the past few years and may be described as follows: In the presence of exten-

sive esthiomene of the anal margin complicated by multiple active abscesses and fistulas the first stage of the treatment is the performance of a double barrel colostomy. Sulfonamides and penicillin are given for the purpose of diminishing the severity of the infection. In some instances roentgen therapy is administered. Later perineal excision is performed.

TABLE V
INFLAMMATORY RECTAL STRICTURE

No. Cases	704	
Colostomy and perineal excision (Lockhart-Mummery)	51	
Mortality (1 death)	1.9%	
Abdominoperineal proctosigmoidectomy	22	
Mortality	0	

On the other hand, when esthiomene, abscess and fistula are absent, an abdominoperineal proctosigmoidectomy is performed. In twenty-two patients with rectal stricture we have instituted this technic; and while there has been no fatality, we believe that more complications and sequelae have arisen than we believe should have occurred.[4] It is our opinion that for patients in this category the most satisfactory method is a three-stage maneuver consisting of (1) transversotomy and after a rest period; (2) an abdominoperineal proctosigmoidectomy with preservation of the anal sphincter musculature; (3) extraperitoneal closure of the loop transversotomy.

Intestinal Polyposis. Our experience with this disease entity while not large has been sufficient to formulate conclusions as to its surgical management. It is our opinion that with the establishment of the diagnosis of polyposis by sigmoidoscopy and roentgenography employing the double-contrast technic, radical surgical extirpation should be instituted without delay. Several instances of resection, total or partial, have been performed without fatality and with low morbidity. In a few cases proctosigmoidectomy alone or in combination with left hemicolectomy has been instituted with preservation of the anal sphincter musculature.

SUMMARY AND CONCLUSIONS

A series of patients suffering with malignancy of the anal canal, rectum and sigmoid colon is discussed in relation to surgical treatment. Evidence is offered to show that mortality following proctosigmoidectomy is low, morbidity is decreased and rate of survival is satisfactory. Our experience with the surgical treatment of diverticulitis, chronic ulcerative colitis, endometrioma of the sigmoid, inflammatory stricture and polyposis is described.

REFERENCES

1. BABCOCK, W. W. Advances in the operative treatment of cancer of the large bowel. *J. Internat. Coll. Surgeons*, 9: 179, 1945.
2. BACON, H. E. Abdominoperineal proctosigmoidectomy for cancer of the rectum. *Am. J. Surg.*, 71: 728, 1946.
3. BACON, H. E. The surgical treatment of lymphogranulomatous venereal stricture of the rectum. *South. M. J.*, 34: 31, 1941.
4. BACON, H. E. Anus, Rectum and Sigmoid Colon. 3rd ed. Philadelphia, 1948. J. B. Lippincott Co.
5. BACON, H. E. and MCKAY, E. R. The surgical management of sigmoidal diverticulitis. *Univ. Minnesota Seminar*, February 6, 1948. *J. Internatl. Coll. Surg.* 11: 582, 1948
6. BACON, H. E. and LINDE, S. A. The surgical treatment of diverticulitis. *Tr. Am. Therap. Soc.*, May, 1946.
7. BACON, H. E. and MCKAY, E. R. The advantages and disadvantages of abdominoperineal proctosigmoidectomy. Read before Highland Park Medical Assembly, Detroit, Mich., Nov., 1947. (In press.)
8. BACON, H. E. and ROWE, R. J. Primary resection for cancer of lower bowel. *New York State J. Med.*, 48: 607, 1948.
9. BACON, H. E. and SMITH, C. H. The arterial supply of the distal colon pertinent to abdominoperineal proctosigmoidectomy with preservation of the sphincter mechanism. *Ann. Surg.*, 127: 28, 1948.
10. BACON, H. E. and SMITH, C. H. Hemicolectomy and proctosigmoidectomy with transplantation of transverse colon to anus. *J. Internat. Coll. Surgeons*, 10: 661, 1947.
11. BACON, H. E. and VAUGHAN, G. D. Abdominoperineal proctosigmoidectomy for rectal cancer: its complications and sequelae. *Journal-Lancet*, 68: 389, 1948.
12. BACON, H. E. and VAUGHAN, G. D. Abdominoperineal proctosigmoidectomy with particular reference to incidence of local recurrence. Read before Stark County Medical Society, Massillon, Ohio, Sept. 10, 1947.
13. BERGEN, J. A., LINDAHL, W. W., ASHBURN, F. S. and PEMBERTON, J. DEJ. Ileostomy for chronic ulcerative colitis. *Ann. Int. Med.*, 18: 43, 1943.
14. CATTELL, R. B. Discussion of H. Cave. Late results in treatment of chronic ulcerative colitis. *Ann. Surg.*, 124: 716, 1946.
15. CAVE, H. W. Late results in the treatment of ulcerative colitis. *Ann. Surg.*, 114: 46, 1941.
16. CAVE, H. W. Surgical experiences with ulcerative colitis. *S. Clin. North America*, 25: 301, 1945.
17. CAVE, H. W. Late results in treatment of chronic ulcerative colitis. *Ann. Surg.*, 124: 716, 1946.
18. DEVINE, H. B. Operation on defunctioned distal colon. *Surgery*, 3: 165, 1938.

19. Ferguson, L. K. and Erb, W. H. Surgical treatment of chronic ulcerative colitis. *Pennsylvania M. J.*, 50: 1170, 1947.
20. Garlock, H. H. The surgical treatment of intractible ulcerative colitis. *Ann. Surg.*, 113: 2, 1941.
21. Garlock, J. H. Further experiences with the surgical treatment of intractible ulcerative colitis. *New York State J. Med.*, 45: 1309, 1945.
22. Jones, T. E. Considerations of elective surgical procedures in various segments of the colon. *Surgery*, 14: 343, 1943.
23. Kiefer, E. D. and Jordan, S. M. A review of the problem of chronic ulcerative colitis. *Tr. Am. Proct. Soc.*, 47: 487, 1946.
24. Lahey, F. H. Ulcerative colitis. *New York State J. Med.*, 41: 475, 1941.
25. Lemmer, K. E. Surgery in ulcerative colitis. *Ann. Surg.*, 113: 1062, 1941.
26. McKittrick, J. S. Idiopathic ulcerative colitis. *Tr. Am. S. A.*, 53: 175, 1935.
27. Pemberton, J. deJ., Black, B. M. and Maino, C. R. Progress in the surgical management of diverticulitis of the sigmoid colon. *Surg., Gynec. & Obst.*, 85: 523, 1947.
28. Pemberton, J. deJ. The effect of chemotherapy on surgery of malignant lesions of the colon. *Proc. Staff Meet., Mayo Clin.*, 22: 561, 1947.
29. Rankin, F. W., Bargen, J. A. and Brown, P. W. Indications for the technique of ileostomy in chronic ulcerative colitis. *Surg., Gynec. & Obst.*, 55: 196, 1932.
30. Schofield, F. D. and Bacon, H. E. Endometriosis of the rectum and sigmoid. *Ann. Surg.*, 107: 1022, 1938.
31. Wangensteen, O. H. Complete fecal diversion achieved by a simple loop colostomy. *Surg., Gynec. & Obst.*, 84: 409, 1947.
32. Wangensteen, O. H. and Toon, R. W. Primary resection of the colon and rectum with particular reference to cancer and ulcerative colitis. *Am. J. Surg.*, 75: 384, 1948.
33. Ault, G. W. Surgical treatment of chronic ulcerative colitis. *Am. J. Surg.*, 75: 325, 1948.
34. Bacon, H. E. and Vaughan, G. D. The surgical management of chronic ulcerative colitis. Read before the Sixth Internat. S. Congr., Turin, Italy, May 27, 1948.

SELECTION OF PATIENTS AND ANASTOMOTIC PROCEDURES FOR CARCINOMA OF RECTUM AND RECTOSIGMOID*

R. Russell Best, M.D.
Omaha, Nebraska

In the progress of surgery, particularly the eradication of malignancy, the pendulum swings from the original procedure which in usually conservative with grave consideration for retaining normal physiology to a more radical procedure with destruction of everything which might possibly be involved. This pattern is followed because the original operation has resulted in too many recurrences of the cancer. Then after improvement in results by the more radical method the pendulum swings again (I omit the word "backward") as now with more detailed knowledge, experience and interim advances in technic and supportive treatment, consideration is again given to physiologic preservation or reconstruction. This pattern has been followed in carcinoma of the rectum and rectosigmoid and at this time many are seriously concerned about preserving the anal sphincter mechanism. This demands more thought and attention to the type of operative procedure selected for the patient because some slight technical change may alter the mortality, morbidity and curability. Also, this has caused us to give more consideration to the type of procedure the patient desires. I believe it is the inherent right of the patient to express his preference for a permanent colostomy or for some type of operative procedure with sphincter preservation providing he has some understanding of the possible smaller percentage of cures without colostomy as well as an appreciation of the disadvantages of the colostomy. This means a different and more difficult psychologic approach for the surgeon because for the moment he cannot speak with the same assurance as to possibilities based on a rather long experience of his own or his colleagues. Again it means more effort technically and from my experience a few more complications. Maybe this is good for us. At least it is not harmful if it is beneficial to the patient.

For forty years we have almost universally accepted the dictum of Miles that carcinoma easily, readily and frequently extends upward, laterally and downward. Little attention was given to analyzing the article by McVay[15] in 1922 when he reported on the involvement of the lymph nodes in one hundred cases of carcinoma of the rectum. Although forty-seven of these cases had metastasis to lymph nodes, in only one case was there involvement of a node below the lower margin of the lesion and this was only at the 1 cm. distance. Since then other important studies have appeared, namely, Wood and Wilkie[22] in 1933, Westhuer[21] in 1934, Gabriel, Dukes and Bussey[11] in 1935, Gilchrist and David[12] in 1938, Coller, Kay and Mac Intyre[8] in 1940 and Grinnell[14] in 1942. These authors reported 507 cases all closely studied for retrograde lymph gland metastasis. Only eight cases revealed involvement of nodes below the lesion. In 1944 Glover and Waugh[13] further substantiated the fact that metastasis at a greater distance than 2 cm. from the lower margin of the lesion was unusual. They analyzed one hundred surgical specimens of advanced carcinoma of the rectosigmoid region. There were thirty-six instances in which a node was involved below the lesion, but in only three were nodes more than 2 cm. below the lesion involved. This study was based on specimens which had been fixed in formalin for a long period of time and one would not expect the results to be quite as reliable. Nevertheless the figures hold up against the apparently more accurate studies of Gilchrist and David, and Grinnell by the modified Spalteholtz method. With this additional series we have a total of 607 cases. In only twelve instances (2.3 per cent) the node involved was more than 1 cm. from the lower margin of the lesion and in only five instances (.82 per cent) the node involved was more than 2 cm. from the lower margin of the lesion. (Table 1.) This is of definite

* From the Department of Surgery, University of Nebraska College of Medicine, Omaha, Neb.

significance since our reports for five-year cures for carcinoma of the rectosigmoid and rectum vary between 45 and 70 per cent. If only .82 per cent of patients have nodes involved more than 2 cm. below the lower margin of the lesion, and if we transect the rectum 2½ cm. (1 inch) to colosigmoid tissue to offer opportunity for complete eradication of vulnerable tissue.

Invasion of the venous channels and spread by this means probably occurs more frequently than is usually realized. It is not unusual to see patients who have liver metastasis in addition

TABLE 1

COLLECTED DATA ON INCIDENCE OF LYMPH GLAND INVOLVEMENT BELOW MARGINS OF MALIGNANT LESIONS

Author	Year	Cases Studied	Cases with Nodes (1 to 2 cm. below lesion)	Cases with Nodes (2 cm. or more below lesion)
McVay	1922	100	1	0
Wood and Wilkie	1933	100	0	0
Westhuer	1934	74	1	0
Gabriel, Dukes and Bussey	1935	100	2	0
Gilchrist and David	1938	25	0	2
Coller, Kay and MacIntyre	1940	33	1	0
Grinnell	1942	75	1	0
Glover and Waugh	1944	100	6	3
Total cases	....	607	12	5
Percentage	....	....	2.3	.82

5 cm. (2 inches) below the lesion and leave an anorectal stump, there is little reason to fear that we are leaving involved nodes in most cases. Also, many studies on serial section of the rectal wall below the lesion rarely reveal intramural extension below the 2½ cm. (1 inch) level. However, if we are to keep curability foremost in our minds as well as to try to avoid the permanent abdominal anus, care must be taken to be sufficiently radical in removing adequate sigmoid and mesosigmoid with the most vulnerable gland-bearing tissue. It is my belief that when one has a small rectal stump which can be elevated for the anastomosis, he is less likely to sell short the adequate removal of the sigmoidal or descending colon tissues. Among other reasons at the present time this forces me to choose some type of anastomotic procedure rather than any pull-through operation in most cases.

Lateral spread has been sufficiently proven so that it is not controversial. However, an area at the level of the levator ani muscle and fascia requires additional analysis and will be discussed elsewhere. (Fig. 1.)

The main pathway for extension is upward and we must sacrifice sufficient mesentery and to a small, invasive type of tumor with or without lymph gland involvement. Gilchrist and David[12] and also Coller[8] reported evidence of vein metastasis as approaching 15 per cent of their cases. Bacon[2] reported 12.9 per cent.

The reconstruction of continuity with attempt at sphincter preservation may be accomplished in two different ways, namely, direct anastomosis between remaining anus or rectum and the sigmoid or colon; or by pulling the sigmoid or colon through anal margin tissues. Many individual technics exist with such variation of details as using or not using a rectal rubber tube to serve as a splint; removing or not removing the coccyx or a segment of the sacrum; anterior or posterior incision or both of the anal sphincter; excision of external or internal sphincter muscle or both; and many methods and types of sutures. In most instances in which the pull-through technic as advocated by Babcock and Bacon employing the Hochenegg principle has been used, the sphincter entity has been disturbed by incision or excision of some part of it. In the relatively few times I have carried out this principle of reconstruction or have had the opportunity to examine patients operated upon

elsewhere I have not been impressed by the degree of radical excision of tissues in the supra-sphincter and levator ani regions or by the appearance or anal security. However, one cannot deny that in an occasional case in which an anastomotic procedure has been accomplished through a posterior approach the sphincter is not quite the dependable master of the area under all circumstances that it was previous to surgery.

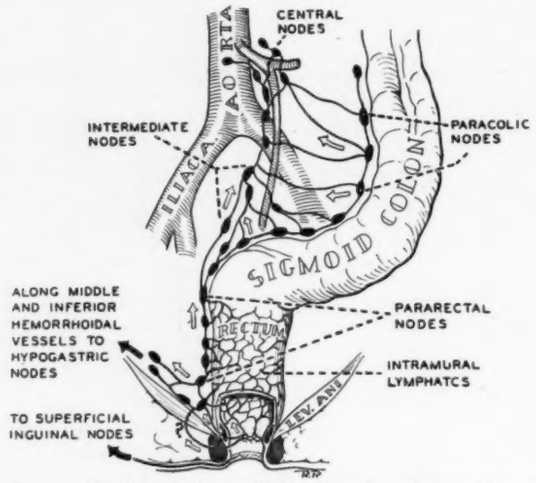


FIG. 1. In the anal canal three modes of spread are considered. The anal skin is drained by lymphatics leading to the superficial inguinal nodes. Above the skin margin is an intermediate area which may drain laterally to the undersurface of the levator ani and recent studies reveal that the pathway through the levator muscle at the site of the question mark does not exist. The lymphatics on the undersurface continue on the undersurface to the lateral pelvic wall. Other channels lead directly upward into intramural lymphatics. The upper anal canal and lower rectum may drain along the upper surface of the levator ani and into the hypogastric nodes or proceed upward along the pararectal nodes. Observations suggest that pararectal and paracolic nodes tend to drain into the intermediate nodes; but if these become blocked, the spread is likely to be directly upward along the paracolic nodes.

Eradication of rectal carcinoma followed by an anastomotic procedure may be accomplished in three different ways which I have previously described,[4,5] namely, abdominal dissection with abdominal resection and anastomosis; abdominal dissection with posterior resection and anastomosis; and posterior dissection with posterior resection and anastomosis. With the combined abdominal and posterior approach as used for direct anastomosis in some cases, there is more radical excision of the levator ani muscle and fascia than when a pull-through operation is used. We believe this is very important in lesions involving the 5 to 7½ cm. level, and this statement is based on investigations and study of the lymphatics of the levator ani muscle and fascia over a two-year period. This study is nearly completed and will be reported.

In selecting patients for rectosigmoidectomy and anastomosis it is well to keep in mind those conditions which are primarily antagonistic to safe or satisfactory accomplishment: (1) One should be hesitant about attempting anastomosis and favor the abdominoperineal excision in very obese, heavy set individuals. We are quite confident that an anastomotic operation is more difficult for the surgeon and more trying and exhausting for the patient, particularly the abdominal dissection with abdominal resection and anastomosis. This is more pronounced in the obese patient. The surgeon must have better exposure and more relaxation; and with the time in the abdomen lengthened because of the anastomosis, a more prolonged and deeper anesthesia is necessary. There is less security of the anastomosis line because of the abundant fat and the infective factor is more hazardous. Also, the posterior dissection with posterior resection and anastomosis is usually difficult in this type of patient and, furthermore, this type of procedure is not sufficiently radical. (2) In all poor risk patients one should favor colostomy and posterior excision or even abdominoperineal excision rather than an anastomotic procedure. In some cases simple colostomy, radium or electrocoagulation may be indicated. Possibly the posterior dissection with posterior resection and anastomosis should be recommended in some of these cases when the lesion is 5 to 7½ cm. (2 to 3 inches) from the external margin of the anal sphincter, particularly in those patients in the late seventies or eighties.

Location of the lesion as well as the age and general condition of the patient serve as an indication for which one of the three operations should be applied in the individual case. The abdominal dissection with abdominal resection and anastomosis is usually selected for a lesion of the rectosigmoid and for upper rectal lesions whose lower margin is at least 7½ cm. or more from the external anal margin. With a lesion whose margin is below this approximate level, lateral spread over levator fascia is a possibility and abdominal approach does not permit

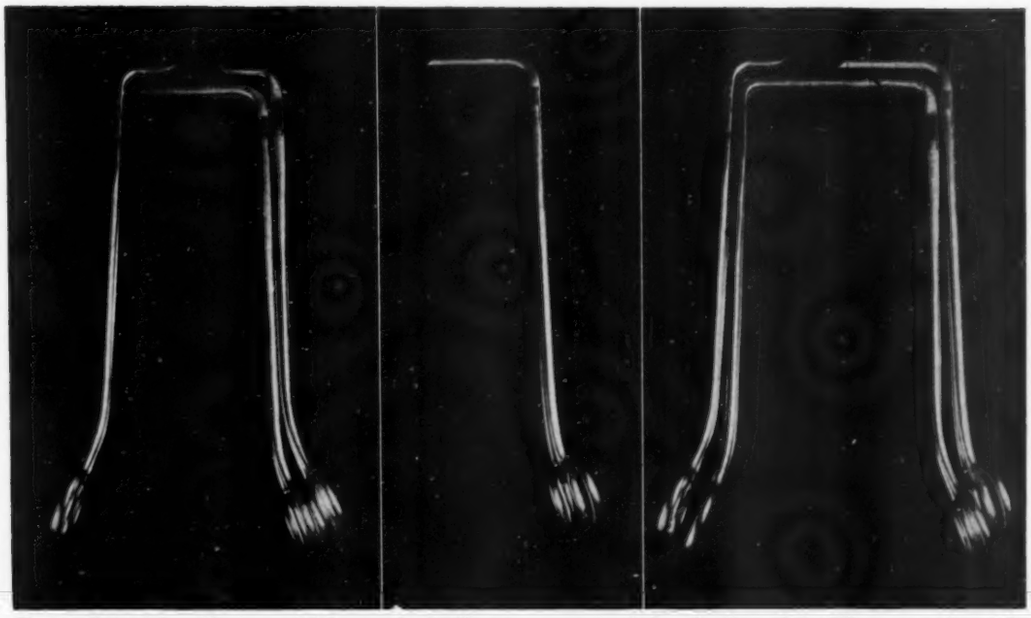


FIG. 2. Set of four clamps which greatly facilitate anastomosis low in the pelvis. The extra clamp is used in case of a very narrow rectum permitting both the lower clamps to grasp the lower segment. In a very wide rectum the clamps may be so applied as to secure complete crushing of the upper segment and leave only a small opening between ends of the lower clamps. (Courtesy of V. Mueller & Company, Chicago.)

adequate removal of the zones of lymphatic spread in the levator muscle and fascia. On several occasions I have anastomosed the rectum by the abdominal route to within 1 inch of the anal canal. However, no surgical procedure should be advocated merely on the grounds that it is technically possible. On nine occasions I[6] have anastomosed the ileum to the rower rectum or anus. The results have been reported elsewhere but they were not very satisfactory and indications for this procedure seem limited to polyposis of the colon with a low lying rectal carcinoma.

The second procedure, abdominal dissection, posterior resection and anastomosis, is recommended when the lower margin of the malignant lesion is below the 7½ cm. (3 inch) level but yet above the 3 cm. level. Abdominal dissection assures radical removal of the zone of upward spread and the posterior attack permits removal of lateral lymphatic spread in the levator fascia and muscle or direct extension into the levator muscle and fascia. These structures are not adequately removed by an abdominal dissection. (Fig. 1.)

The third procedure, posterior dissection with posterior resection and anastomosis, cannot be considered adequate surgery for cancer of the rectum. It is recommended only under special circumstances and as an escape from a higher mortality in the aged and a few of the poor risk cases.

We should have some generally accepted standard for measuring the height of these lesions. For reasons of simplicity and accuracy it is suggested that we accept the method of recording the distance from the external margin of the anal sphincter. The average index finger reaches to a height of 7½ to 8 cm. (3 inches) and the second joint reaches approximately to the 5 cm. (2 inch) level. Certainly the only accurate method of measuring with the scope is to have the end of the scope against the lower margin of the lesion and record the distance from the lesion to the external sphincter margin.

Figures are the only criteria for analysis; and although frequently they seem difficult to appreciate because of detours in methods of determination and correlation, a recent analysis of a small series of thirty-three consecutive cases is reported. Of these thirty-three patients I examined five were considered too far advanced for the possibility of resection. One of these five patients was advised to have and submitted to a colostomy because of impending obstruction. Not including the latter, twenty-eight patients were submitted to operation on

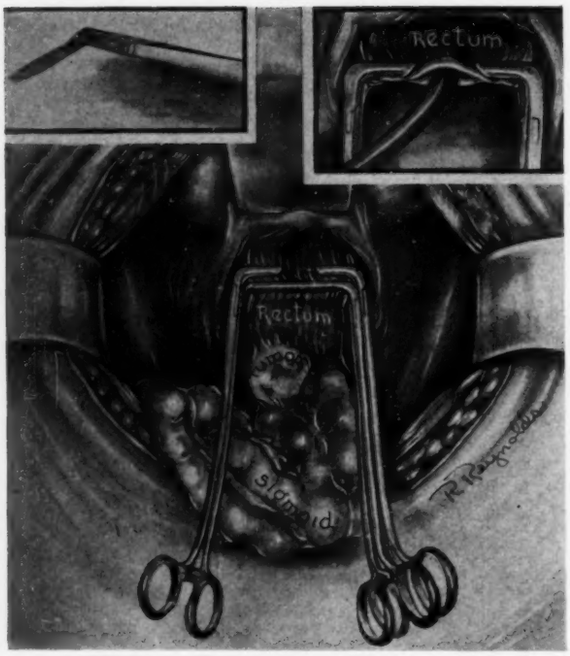


FIG. 3. Rectum dissected free and clamps applied; with angled knife the rectal segment is transected. This should be at least 1 inch below lower margin of lesion and preferably 2 inches. A suction catheter is placed between the ends of the lower clamps and into the rectum.

the possibility that resection could be accomplished. This is an operability rate of 84.8 per cent. Of these twenty-eight cases colostomy alone was done in three instances without mortality. The remaining twenty-five cases were subjected to resection with preservation of the sphincter mechanism or abdominoperineal resection, a resectability rate of 75.7 per cent. In three of these cases an abdominoperineal resection was done without mortality; and in twenty-two cases (88 per cent) intestinal continuity was re-established in the rectum and the sphincter mechanism preserved. It is my opinion at the present time that this figure of 88 per cent is a little too high for the number of cases in which sphincter preservation should be restored. In retrospect and from further experiences it is probable that an abdominoperineal resection should have been done in two of the twenty-two cases which would have resulted in only 80 per cent of the cases submitted to resection having intestinal continuity restored. In like manner it might have reduced the mortality. As it was there were two deaths, a mortaility of 8 per cent for the twenty-five cases submitted to curative surgery with or without anastomosis and a 9 per cent mortality for the group in which an anastomotic procedure was carried out. (Table II.)

We do an open type of anastomosis whether this is accomplished from within the abdomen (Figs. 3, 4, and 5) or by the posterior approach. (Fig. 7.) For the anastomosis done within the abdomen special clamps have been devised to facilitate the technic when working deep in the pelvis and are depicted in the accompanying drawing. (Fig. 2.) A supplemental cecostomy or appendicostomy of a modified Gibson type (Fig. 6) is done routinely in all cases of abdominal dissection with abdominal resection and anastomosis and in cases of abdominal dissection with posterior resection and anastomosis. In cases with posterior dissection and posterior resection and anastomosis a rectal tube is used rather than a cecostomy. We believe that a cecostomy is just as efficient as the nasogastric or naso-intestinal tube, is much more comfortably for the patient and with any leak at the suture line it serves much better. We have had no difficulty with the cecostomy failing to close immediately after removal of the mushroom catheter.

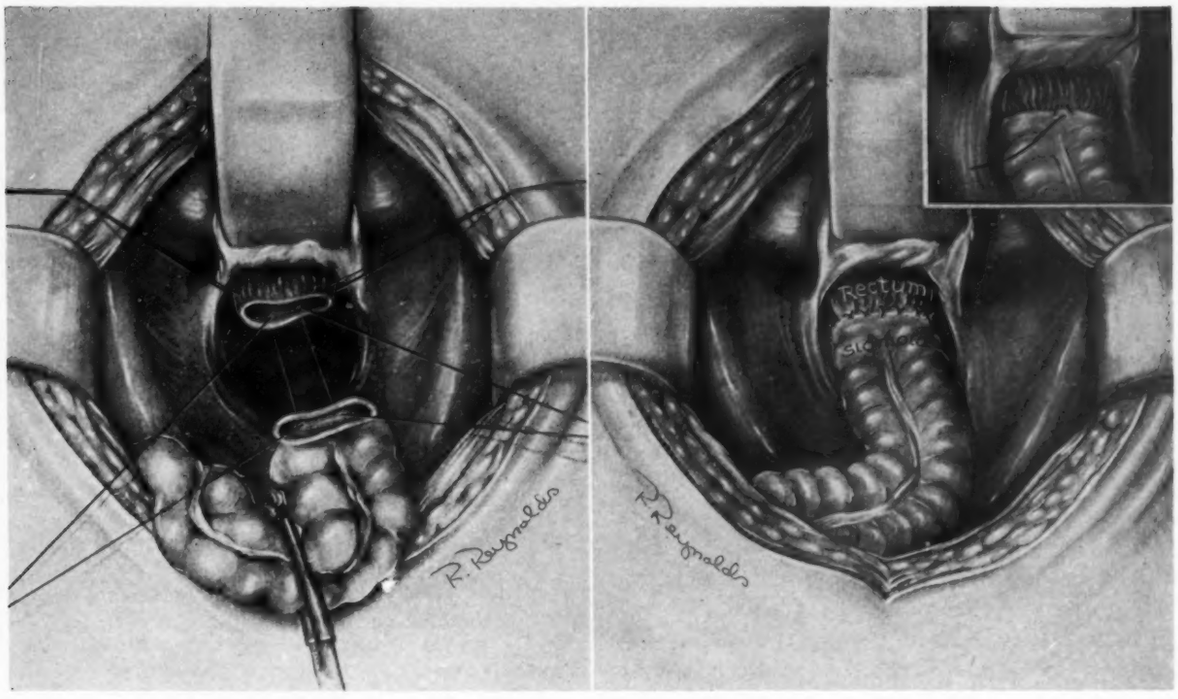
TABLE II
CARCINOMA OF RECTUM AND RECTOSIGMOID ANALYSIS OF THIRTY-THREE CONSECUTIVE CASES

Cases	Operated*	Resected*	Anastomosis†	Abdominoperineal‡
Number—33	28	25	22	3
Per cent	84.8%	75.7%	88%	12%
Mortality				
Deaths	.....	2	2	0
Per cent	.....	8%	9%	

* Per cent of total cases seen.
† Per cent of resectable cases—too high?
‡ Per cent of resectable cases.

We drain the retrorectal space in the hollow of the sacrum by the posterior approach in every case. Following removal of this drain we frequently have a draining sinus for some days or weeks and at times feces appear. Two of these posterior draining sinuses although small proved stubborn and annoying for several months.

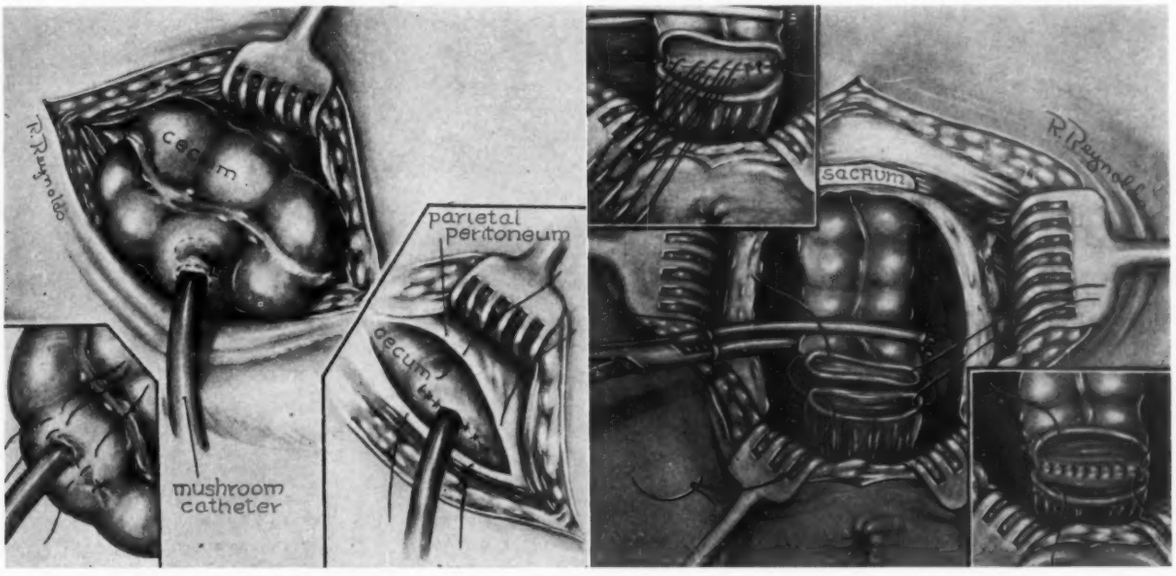
Incontinence has not been a troublesome factor but it cannot be denied that the sphincter in some cases seems to lack its original energetic tone. This is particularly true when the resec-



4 5

FIG. 4. The short nosed clamps have been replaced by traction sutures. Then five guide sutures are placed on the posterior walls similar to the two already inserted. The knots are on the mucosal side so as to invert the margins firmly. (Courtesy of *Surg., Gynec. & Obst.*, 86: 98–106, 1948.)

FIG. 5. A single layer of interrupted figure-of-eight or mattress silk sutures complete the anastomosis. An attempt is also made to place such sutures on the entire posterior wall so as to support the catgut sutures. (Courtesy of *Surg., Gynec. & Obst.*, 86: 98–106, 1948.)



6 7

FIG. 6. A supplemental cecostomy by purse-stringing a mushroom catheter into the cecum. The cecal wall is inverted and the cecum fixed to the parietel peritoneum. (Courtesy of *Surg., Gynec. & Obst.*, 86: 98–106, 1948.)

FIG. 7. Posterior anastomosis with inner row of interrupted catgut sutures. To facilitate the procedure all sutures on the anterior wall are inserted and then tied. After tying these sutures a row of inverting interrupted figure-of-eight silk sutures is inserted around the entire rectum. (Courtesy of *Surg., Gynec. & Obst.*, 86: 98–106, 1948.)

tion and anastomosis are done posteriorly in the more feeble individuals in their late seventies or eighties. In two cases we encountered the problem of feces collecting between the sphincter area and the line of anastomosis with the patient unable to expel the feces without an enema. This difficulty lasted for several weeks.

It is impossible at this time to give dependable figures on curability for operations directed toward maintenance of the sphincter mechanism. There have not been a sufficient number of patients operated upon by a sufficient number of surgeons over a long enough time. Excluding those on pull-through operations, all figures on morbidity, mortality and curability are based upon antiquated technic and pre- and postoperative care before the days of what might be termed modern surgery. Three, five and ten years hence one can speak with authority but in the meantime we can attempt to avoid colostomy in selected cases and hope that technical improvements and further anatomic-pathologic knowledge will promote an encouraging report.

REFERENCES

1. Babcock, W. W. One stage simplified proctosigmoidectomy with formation of perineal anus. S. Clin. North America, 12: 1397, 1932.
2. Bacon, H. E. Evolution of sphincter muscle preservation and re-establishment of continuity in the operative treatment of rectal and sigmoidal cancer. *Surg., Gynec. & Obst.*, 81: 113, 1945.
3. Bacon, H. E. and Rose, J. Primary resection for cancer of the lower bowel. *New York State J. Med.*, 48: 607, 1948.
4. Best, R. R. Selection of operative procedure to avoid colostomy in carcinoma of rectum and rectosigmoid. *Surg., Gynec. & Obst.*, 86: 98, 1948.
5. Idem. An evaluation of colorectostomy and immediate anastomosis of the rectum. Presented before the Western Surgical Association, Dec., 1947. *Ann. Surg.* (In press.)
6. Idem. A report on experiences with anastomoses of the ileum to the lower rectum and anus—ileorectostomy and ileoproctostomy. Presented before the Central Surgical Association, Feb., 1948. *Arch. Surg.* (In press.)
7. Cadol, Armand. Histologie pathologique et traitement du cancer du rectum. *Arch. gen. de Med.*, 1: 571, 1898.
8. Coller, F. A., Kay, E. B. and McIntyre, R. S. Regional lymphatic metastasis of carcinoma of rectum. *Surgery*, 8: 294, 1940.
9. Dixon, C. F. Anterior resection for carcinoma low in the sigmoid and rectosigmoid. *Surgery*, 14: 367, 1944.
10. Fallis, L. S. Anterior resection of rectosigmoid and upper rectum with re-establishment of continuity. *Surgery*, 14: 397, 1943.
11. Gabriel, W. B., Dukes, C. and Bussey, H. J. R. Lymphatic spread in cancer of the rectum. *Brit. J. Surg.*, 23: 395, 1935.
12. Gilchrist, R. K. and David, V. C. Lymphatic spread in carcinoma of rectum. *Ann. Surg.*, 108: 621, 1938.
13. Glover, R. P. and Waugh, J. M. The retrograde lymphatic spread of carcinoma of the rectosigmoid region. *Surg., Gynec. & Obst.*, 82: 434, 1945.
14. Grinnell, R. S. The lymphatic and venous spread of carcinoma of the rectum. *Ann. Surg.*, 116: 200, 1942.
15. McVay, J. R. Involvement of the lymph nodes in carcinoma of the rectum. *Ann. Surg.*, 76: 755, 1922.
16. Miles, W. Ernest. A method of performing abdomino-perineal excision for carcinoma of the rectum and of the terminal portion of the pelvic colon. *Lancet*, 2: 1812, 1908.
17. Murray, Gordon. Resection of the rectum with reconstruction of canal through the perineal approach. *Surg., Gynec. & Obst.*, 82: 283, 1946.
18. Poirier, P., Cuneo, and Delamere, G. The Lymphatics. Chicago, 1904. Keener & Co.
19. Rankin, F. W. How surgery of the colon and rectum developed. *Surg., Gynec. & Obst.*, 64: 705, 1937.
20. Wangensteen, O. H. Primary resection of rectal ampulla for malignancy with preservation of sphincteric function. *Surg., Gynec. & Obst.*, 81: 1, 1945.
21. Westhuer, H. Die pathologish-anatomischen grundlagen der chirurgie des rectum karzinomas. Leipzig, 1934. Georg Thieme.
22. Wood, W. Q. and Wilkie, D. P. D. Carcinoma of the rectum: Anatomical-pathological study. *Edinburgh M. J.*, 40: 321, 1933.

DISCUSSION OF PAPERS BY DRS. WOLFE, MCNEALY, BEST, BACON AND VAUGHAN

Raymond W. McNealy (Chicago, Ill.): The subject of carcinoma of the rectum is so extensive in all of its implications that I shall make no attempt to cover the field.

I make the stipulation first that since we are unacquainted with the cause of carcinoma, we shall make no claims for cure, but simply state what the period of life has been after the operation. We believe that we accomplish our ends when we lengthen the life of the patient.

I like Dr. Best's statement that some of the pull-through operations do not leave the complete mastery of sphincter control that one might desire.

In primary resection with immediate anastomosis, there are several things that have to be there at the time you do the operation. First, you have to have a clean bowel. By that, I mean it has to be free of fecal material. More important probably is the fact that it must be free from

barium which has been given before surgery. In our hospital we keep reiterating the statement that no patient can be brought to the operating room for resection of the large bowel who has not had a fluoroscopic examination on the day before the operation. This is done to be sure that the bowel is free from all foreign material at the time we expect to do an anastomosis of the bowel.

Another stipulation that I think is very important is that when you are going to anastomose the cut ends of a bowel that is as thin as the large bowel and whose circulation is as equivocal as it is in some instances in which you free it rather liberally from its original site, that there be absolutely no trauma to those bowel ends before you anastomose them.

We absolutely prohibit the use of any crushing forceps on any bowel edge that is to be united end-to-end. In other words, if you want to put a soft rubber-covered clamp below or above, all well and good, but on the edges that are going to be sewn you must not clamp those edges before you sew them. If crushed they have to slough off and that sloughing and separation of the dead tissue is certainly a favored site for the beginning of infection along your suture line.

The next point I would want to make is that if you sew the large bowel, be sure that in your sutures you do not strangulate the tissue that you would like to have unite. In other words, too many sutures often mean too many leaks. A few sutures well placed and well disposed around the lumen are much better than a great number placed indiscriminately. Reinforcements of second and third suture lines are likely to cause complete necrosis of the ends that were originally united by the first row. We have more than fifty resections with primary anastomoses in whom only one row of interrupted fine silk sutures are used on the posterior wall and two rows laterally and anteriorly.

As far as the question of doing a proximal appendicostomy or cecostomy is concerned, in none have we used any method of proximal decompression except the indwelling nasal suction. In all cases we have maintained a rectal tube in the rectum so that we have an air vent distally.

We have never placed a drain near or approximating any anastomosis. I would call your attention to that point. It is important not only in bowel surgery but also in all other plastic repairs of viscera. If you want the line of suture to hold and if you want to avoid fistula formation, never place a capillary drain down to the line of suture. If one places a drain down to the line of suture, the capillarity of the gauze or the Penrose or whatever drain you use will "wick" away by capillarity the plastic exudates, which is the best cement medium that we have for uniting the ends. If it is all "wicked" away, you cannot expect other than fistula formation.

Regarding the improvement we have had in large bowel surgery, I think we can predicate it on two essential bases. The first is that we have become acutely conscious of the necessity of having these carcinoma patients in good condition when we operate upon them. By that I mean the best possible condition into which they can be brought. We very seldom have emergency operations on carcinomas of the large bowel, not nearly the number that we formerly had; and when these patients come in, most of them, by suction or by careful manipulation can be decompressed very well. A rather tedious preoperative care is used in all patients. They have the advantage of the blood bank; they have the advantage of bringing their cevitamic acid levels up, and increasing their healing capacity. Their liver tolerance, and water balances are carefully checked.

The second point is that after these patients are in good general physical shape we direct our attention to the use of the biostatics or antibiotics (sulfa drugs, and penicillin). These have made our results far better than they were before. The liquefaction of the stools as well as their lowered bacterial content has made open anastomosis much more secure.

Blind anastomoses and the so-called aseptic anastomoses are rapidly disappearing as we are having better results in cleaning the bowels out and getting them in better shape for anastomosis.

Our results should improve as we improve in the preparation of the patients and as we improve in our technical facilities. Good healthy tissues will grow together very well. They are well immunized by nature and they need little to encourage their union except we must facilitate the action of the normal healing mechanisms of the body.

W. Wayne Babcock (Philadelphia, Pa.): While not evident this morning, it seems to me in the surgery of the large bowel that we often cling to teachings and methods of a past generation which now should be obsolete. Operators still condemn the modern abdominoperineal resection for carcinoma from experience they had with the Hochenegg or other old perineal or sacral method of resection, none of which are radical, none of which are aseptic, and all of which carry the complications of a suture anastomosis made through the pelvic floor. None of these antique procedures should have a place in the treatment of carcinoma of the rectum or sigmoid. The Hochenegg operation in which the lower segment of rectum instead of being removed with the attached growth was denuded of mucosa and used as a sheath through which the upper segment was telescoped, was particularly objectionable. These operations gave me as well as others in the early part of the century a great deal of trouble. They taught that a perineal approach could not be sufficiently radical for the proper removal of a carcinoma of the rectum or sigmoid.

They showed the necessity for a free liberation of the rectosigmoid through an abdominal incision, that a suture anastomosis should not be used in the pelvic floor and that the bowel, with its active peristaltic waves, should not be sutured to the skin or any other fixed part. A few years since, Dr. Wangensteen tried some of these old perineal anastomotic resections with modern aseptic controls but had, as would be expected, an undue number of septic sinuses or fistulas. When the opened perineum is closed as at the termination of an abdominoperineal pull-through type of resection, we avoid infection by using only stainless steel sutures and ligatures in the perineum, by omitting all perineal drains, and by leaving 12 cm. of unsutured bowel protruding from the perineum until after primary union has occurred.

If the carcinoma involves the rectosigmoid, the adequate removal of lymphatics and the preservation of an adequate vascular supply to the retained bowel can be attained only by an abdominal exposure. We are indebted to Miles for a great improvement over the perineal types of resection for rectal carcinoma. Many patients have been saved by his more radical type of operation, but he was in error in believing that carcinoma diffused caudad as well as laterally and cephalad; also in thinking that it was important to form a pelvic diaphragm to prevent pelvic adhesions. In 195 per cent of the patients the cancer does not invade the pelvic floor, sphincters or anus which need not be sacrified. For eighteen years in proctosigmoidectomy we have freely resected the pelvic peritoneum without forming a pelvic diaphragm, with no secondary trouble from pelvic adhesions. There is good evidence that the catgut used in forming the pelvic diaphragm leads to more adhesions than would the denuded pelvis; while peritoneal recurrences after the Miles operation suggest that in retaining a pelvic diaphragm, insufficient peritoneum is removed. Catgut, silk and cotton left in the peritoneum will produce adhesions, but particularly catgut. Peritoneal adhesions do not form over stainless steel wire. We have later reopened a number of our patients left with a denuded pelvis and have found the pelvis practically free from adhesions.

In the closure of the abdominal wound a new security and safety has followed the exclusive use of non-irritating metallic sutures. In 4,000 consecutive abdominal sections, in 2,000 of which some catgut was used in the abdominal closure, there were seven eventrations. In the 2,000 in which an all wire technic was used and in all such operations in the last five years, there has been only one eventration.

The abdominoperineal pull-through type of operation with retention of the sphincter that we use is indicated for cancers of the rectum or rectosigmoid that, grossly, are at least 6 cm. above the anus. The anal opening permits digital palpation of the lower bowel for recurrence, and we direct the patients to return every one or two months during the first year after operation and at longer periods later. From hundreds of such examinations it has been evident that recurrence from unremoved bits of carcinoma left in the pelvic floor is rare. By these examinations less than 1 per cent have shown such a recurrence unless a palliative or inadequate type of resection had been done. These examinations are also valuable in instructing the patient how to maintain an adequate opening as well as how to control his evacuations properly. I think it is wise in the operation to divide the sphincters; otherwise, if not denuded of mucosa, they have contracted on the withdrawn bowel with secondary gangrene that has a tendency to spread into the pelvis and endanger the patient's life. When divided there is more room for hemostasis and for resection of the prostate or other part that may show invasion.

The divided sphincters are not sutured and care is taken that the withdrawn bowel is not in the least constricted and has a good blood supply. By omitting perineal drainage and using all wire sutures and ligatures, at least 95 per cent of the patients have primary union and a thick, strong perineal floor, without any tendency to a perineal hernia.

Of course, for anal carcinoma the pelvic floor must be sacrificed and secondary perineal hernias are fairly common. For these we have transplanted the colostomy to the buttock or posterior upper thigh, with improvement, and recently have used a strong stainless wire mesh embedded in the floor of the pelvis through a hole in the center of which the bowel is brought to the skin. It is of interest that none of these patients has asked for an abdominal colostomy.

Apparently a perineal colostomy without sphincters is less objectionable than an abdominal colostomy, provided the opening is large, not strictured and free of inflammation. For over sixty patients we have either transplanted or otherwise eliminated an abdominal colostomy. A large proportion had a primary Miles operation, yet none has found the perineal colostomy as objectionable as the abdominal colostomy.

Of course, these patients had the more troublesome or less controllable types of abdominal colostomy or found it an impediment to vocation or marriage. Abdominal colostomies vary greatly as to the trouble they cause. Some are easily controlled and may be exhibited on the stage before an admiring medical audience, while others sputter and spatter and refuse to be controlled by irrigations; or while dry most of the time, are such veritable stench bombs of gaseous iniquity that the possessor cannot hold a job.

One woman wrote, "With my abdominal colostomy I had to take all my clothes off whenever I had an irrigation, and when I got through I not only had to take a complete bath, but also wash my hair and wash the entire bathroom.

One patient with a troublesome abdominal colostomy built an arrangement shaped like an elephant's head, which he held against his abdomen during the irrigation and thus prevented the room from being spattered.

It is of interest that gaseous and other uncontrollable abdominal colostomies, when transferred to the perineum, usually lost their major objections, and with a number of degree of control and ability to go about without a protective pad has been attained.

William H. Daniel (Los Angeles, Calif.): Since the main theme of these three papers it the treatment of lesions of the colon and rectum, with or without colostomy, this discussion will be based primarily upon that question. We still believe that the cure of cancer is paramount, regardless of any changes in anatomy that may be somewhat disconcerting to the patient.

Since the advent of sulfa drugs, penicillin and streptomycin, we have favored the resection and anastomosis in lesions of the mobile left colon. The exteriorization procedure of Mikulicz has its place, especially in cases of prolonged obstruction, in which there is a disproportion between the segments of bowel above and below the tumor.

Dr. Wolfe has presented an excellent description of his surgical procedures and preoperative and postoperative management, in which we concur in practically all details.

Dr. Best has presented his reasons for resections and anastomosis in low rectosigmoid and rectal lesions. We are somewhat confused by all the figures, percentages and centimeters upon which he has based his selections for the procedures which advocates for the cure of cancer of the rectum. We are loathe to accept the dictum that retrograde spread is seldom below 2 cm. because in our experience affected tissue has been demonstrated as low as 2 inches. It has been definitely established that the spread of cancer cells in low tumors of the rectum is through the lymphatics of the levator muscles, and the rich venous supply of the lower rectum enhances the remote metastases to the liver and upward. We are not ready to accept the reports of the pathologist that there is no demonstrable cancer spread from specimens submitted to them, because in many instances the patient has died from cancer metastasis when no cancer cells were identified in the surrounding tissues. We are not in a position to comment upon the merits of the perineal anastomosis in good or poor risks because we have not attempted any of these procedures. It is our opinion that the aged and the poor risk should be given the opportunity to live with a chance of cure with the least hazard. In the aged, in poor risk patients and in those whose life expectancy is short due to metastasis and in whom the tumor is reasonably low, we prefer the colostomy and posterior resection in two stages. We still believe that heat is a detriment to the life of cancer cells, and employ the Percy cautery in all perineal resections wherein the cancer involves the anus and the lower 2 inches of the rectum.

Dr. Bacon has stressed his preference for the removal of cancer of the rectum and rectosigmoid and lesions above by transplanting the sigmoid or colon into the anal muscles in preference to an abdominal colostomy. Late in 1945 we were impressed by his reports, and performed a number of proctosigmoidectomies with preservation of the anal muscles without colostomy.

We selected the cases in which the tumor was at least 3 inches from the anal margin to compensate for any downward spread. For several months we were enthusiastic about our results, until in about one year we were able to palpate metastases in the perineal areas and in the pelvis in several patients. In fourteen months we became discouraged because 33.33 per cent (eight of twenty-four cases) had palpable metastases which were not cured by local or abdominal perineal resections with colostomy.

Five of the twenty-four patients died of primary and secondary metastases to the liver and abdomen which cannot be attributed to the procedure. One surgical death was from a cerebral accident in a hypertensive. Those alive today are satisfied with the perineal colostomy, some using irrigations every second evening. They do not have perfect control and have accidents as do those with an abdominal anus. None has requested the change to an abdominal colostomy. In our experience the hygienic advantage is more psychologic than mechanical.

We have not had an occasion to transplant the transverse colon in the anus, but have in two cases united the transverse colon to the rectosigmoid by end-to-end anastomosis and the Mikuclicz procedure. In one case of malignant polypoid disease of the colon, we have anastomosed the cecum to the rectosigmoid following a colectomy of the involved colon. All are alive with cure a possibility.

During the fourteen months in which we performed the twenty-four pull-through procedures we performed thirty-four abdominoperineal resections with only one local metastasis.

We have no apologies or explanations for our high rate of local metastases which is almost twice that of Dr. Bacon's 17.9 per cent. There were no figures stated by Drs. Wolfe or Best of wound metastases by which a comparison could be made.

Procedures without colostomy are ideal for those patients who absolutely refuse the abdominal anus

or for those in whom incurable cancer metastases have been demonstrated

Louis J. Hirschman (Detroit, Mich.): One word about ileotomy for ulcerative colitis. We have had in the last year experience with two cases preparing to do colectomy after ileostomy; one patient nearly died from massive hemorrhage and the other was losing weight rapidly. We got the patient into the hospital, made a complete gastrointestinal examination and found in the two cases very, very far advanced duodenal ulcers. There may be something in the implant of the ileum and other ulcerative lesions of the upper intestinal tract. It has put us on our guard.

In one case if we had done a colectomy, he certainly would have died.

In the treatment of malignancy in aged patients we agree—and not only in aged but in the younger patients—that the advanced technic in preoperative treatment and preparation has greatly lowered our mortality. I believe in aged patients with our better types of preparation we are able to operate in a much higher age level, in other words, the seventies and eighties and even nineties; and I believe also in those cases by doing local resections, because we know that lymphatic spread is very slow in aged people, we can at least operate for comfort and not endanger their lives by trying too radical an operation.

Then again, particularly in aged people, frequently a malignant polyp can be removed through the proctoscope or sigmoidoscope by electrical means, being sure to take a good portion of the base away with it. The patient will live very comfortably and happily without having to undergo any more serious surgical procedures.

We have these patients come back at repeated intervals every six months for examination and in many cases for several years, without a sign of recurrence, and I believe that is a technic that we should add to our armamentarium, particularly in aged people.

E. G. Martin (Detroit, Mich.): Through some inadvertance a discussion of electrodesiccation in preparing the rectum for a colectomy in multiple polyposis has been omitted. The importance of conserving the rectum by destroying the polyps therein is an established procedure. Electrodesiccation must not be confused with cauterization or even coagulation. It is more radical and goes further. I use the cutting current at eighty-five to ninety for electrodesiccation and reserve the co-agulating current for the destruction of polyps above the peritoneal reflection. Two, three or four radical desiccation treatments may be necessary before the colectomy is done. The technic involves first a lateral anastomosis of the ilium to the lower sigmoid. The cecum is then mobilized easily following the ligation of the blood vessels passing through the mesentery. Two points should be mentioned: The transverse colon is dissected free from the omentum with blunt scissors; this leaves the mesentery *in situ*. The splenic non-vascular ligament is found by running the finger bluntly along the trough of the dissected colon on the upper side; this is cut and the splenic flexure is then readily mobilized. The descending colon and sigmoid are mobilized down to the site where the anastomosis was made, cut across and closed. This finishes the operation with the exception of peritonealizing all exposed areas possible; along the transverse colon it may be omitted. This is a simpler procedure than an abdominoperineal extirpation of the rectum.

I examined a young woman upon whom we had done a one-stage colectomy three months ago. She had gained 18 pounds and had about four soft stools a day. It was a familial case, there being a brother and sister similarly afflicted.

Dr. Harry E. Bacon (Philadelphia, Pa.): I heartily concur with Dr. Wolfe in what he has just said, about adapting the operation to the patient and not the patient to the operation. As Fallis has stated repeatedly, it is the common surgical sin, and that is the reason we believe that it is only proper that one individual operation should not be selected for every type of case.

Several months ago I had the privilege of having Mr. Morgan, of St. Mark's, London, spend a few days with me in Philadelphia, and this is exactly what he said: "Bacon, I don't particularly like the operation that you fellows are doing over here, but, nevertheless, I am frank to admit I have had no experience with it. I have just visited five large cities in the United States and have seen the very best in the surgical world perform the Miles abdominoperineal method of excision, and I am absolutely astonished with the utter lack of radicability. I have not observed the removal of the levators in a single instance."

In other words, I present to you this thought, that independent of the type of operation the individual surgeon may institute, he can be as radical or as conservative as desired.

Dr. Daniel mentioned that he had one case in which invasion was present 2 cm. below the lower margin of the growth. Our residents, Dr. Fleming and Dr. Rowe, a few years ago, with the assistance of the Department of Pathology at Temple University Medical School, examined 146 consecutive bowel specimens following resection and found only one instance in which the cancer had extended to the 6 cm. level.

Regarding the sphincter muscle mechanism, no one will disagree with the fact that sphincter contraction and sphincter incontinence are not synonomous. The degree of anal continence achieved by preserving the anal sphincter muscu-

lature is uniformly satisfactory. These patients do not wear pads, and they do not soil themselves during wakeful or sleeping hours. They are continent because both the three bundles of the external sphincter and the internal sphincter muscle as well have been preserved.

It will be remembered that the defecatory mechanism is derived from two centers, one in the cortex and one in the conus medullaris; but we have been able to show over a period of years that this pulled-down descending colon or upper sigmoid assumes the characteristics of the old ampullary section of the rectum.

Regarding recurrence, you heard what Dr. Babcock has said about his incidence. I can truthfully state, that all our cases of recurrence are based on those that have past the five-year period. There were twenty-seven cases in this group. Four of this number had liver metastasis at the time of operation and so properly should be excluded. Twenty-three patients with recurrence remained, of which twelve were definitely local recurrence. The computed incidence, therefore, is 17.9 per cent.

It should be stated that the incidence as reported by Gilchrist is not 20 per cent, as reported at our meeting last year in Atlantic City, but is 16 per cent.

Wangensteen has recorded an incidence of 14 per cent based on a group under five years.

Dr. Babcock has mentioned his incidence of obstruction. In our group of cases at the present time we have performed 384 cases of proctosigmoidectomy for cancer and thirty-two for allied conditions, a total of 416 cases. To the best of my knowledge I can truthfully state that we have had only five instances of obstruction as a result of the small bowel descending into the presacral space and of that number one was fatal.

Regarding fistula and what Dr. Best has said, we have had in this group of cases one persistent presacral fistula.

Regarding ileo-anal anastomosis, I personally have had no experience whatsoever. Ravitz, of Baltimore, has done some very excellent work and it has been satisfactory, apparently on dogs.

A few months ago in Minnesota I talked with Dr. Wangensteen and he reported that he had had two cases. One he had to return to the abdomen because of the unsatisfactory condition of the perianal skin. The second, he contemplates returning to the abdomen.

Dr. Babcock did not mention, but I think it is correct that he has had two cases, both for ulcerative colitis. In each, replacement to the abdomen was found necessary.

R. Russell Best (closing): Dr. McNealy mentioned the crushing of tissue produced by the clamps which I use. This is a technical factor that we have considered very seriously and we have overcome it by making very sure that we place our sutures about a ¼ inch below the demarcation of the lower margin of our clamp. We do not worry because this bowel is turned to the inside and sloughs into the lumen of the bowel.

Dr. McNealy brought out another point which I think is very important, and I have learned the hard way. That is, not to clean off the fat tabs at the margin of bowel to be anastomosed. There will be fewer breakdowns in the suture line if you utilize these redundant tabs to support the sutures. They do create a crude appearing suture line but it is more secure. If the fat is left and is sort of thrown together in big bites, the results are better.

About the drainage, it is an old axiom in surgery that we do not place a drain on a suture line; but it is true that we must frequently drain such an area, and in placing the drain in the hollow of the sacrum, we make sure that it is below the suture line. We believe that the principle of drainage still holds good where potential leakage must be considered.

How low down should we do an anastomosis in order to leave the sphincter? I am not sure about the answer. It was interesting to read the report of Murray of Toronto, Canada. He reported five cases of posterior resection, to which I cannot agree in the first place, but he resected the lesion when it was within half a centimeter or a centimeter from the sphincter muscle. I do not believe I can subscribe to that type of anastomosis or even to the pull-through procedure. I do not believe Dr. Bacon is advocating sphincter preservation at this low level.

Dr. McNealy and I were discussing the question of vascular spread. There have been several papers recently—I believe one by Gilchrist and David, and another by Carr, Mackey and McIntyre—in which they state they have proved vascular metastasis in about 15 per cent of the cases. That is very important in the analysis of selection of operation for sphincter preservation. It even lends support to the argument for preservation of the sphincter mechanism.

We owe a lot to Dr. Babcock and Dr. Bacon whether we agree with their procedure or not. Their contributions have stimulated us to restoration of the bowel continuity or preservation of the sphincter mechanism, whichever you wish to call it, and out of this something will undoubtedly come in the next five to ten years, whether acceptance of some type of anastomosis or pull-through, I do not know. I am on the fence on that at present but am leaning quite strongly toward the anastomosis in practice.

I cannot agree with Dr. Babcock on the perineal colostomy. I am sure you heard the debate on Communism between Stassen and Dewey; I agree with Dewey that if you have a rascal and do not

have control of him, you should get him out in the open. My belief is the same about colostomies; get them out on the abdomen where you can see them.

Dr. Daniel brought out some of the pertinent and controversial points nicely. That is what this organization is for, to present material and discuss it freely. I disagree with my good friend, Dr. Daniel, however, as to worrying about metastasis below the level of the lesion. I believe that question is fairly well settled by the analysis of the 607 cases gathered from the literature which were studied in a careful and thorough manner. In this group only twelve cases (2.3 per cent) had gland metastasis lower than 1 cm. below the lesion. Only 0.8 per cent of these cases had metastasis at the 2 cm. level or lower. These are important figures as balanced against a recurrence rate of 45 to 70 per cent.

When you do have a metastatic nodule or mass more than 2 cm. below the margin of the lesion or at the 2 cm. level, I believe quite definitely that the lymphatics and glands above the lesion have been blocked if we accept our present understanding of the physiology of the lymphatic system. The tumor cells have gone downward because they have not been able to take the upper channel, and I wonder how many of such cases could be cured by any procedure in which there is this degree of block in the lymphatic channels or glands.

In the studies which we are carrying on and are about to publish on the lymphatics of the levator ani muscle, the fascias of the upper and undersurfaces of the levator ani muscle, we believe we will prove the necessity of excising more of the levator ani muscle and fascia than we have in the past in order to keep our curability rates up with some type of sphincter preservation operation.

POLYPOSIS OF THE COLON IN CHILDREN*

JACK G. KERR, M.D.
Dallas, Texas

IN children when bleeding from the bowel is the presenting symptom, the source of the blood is more likely to be an adenomatous polyp of the rectum or colon than any other single lesion. If bleeding is the only symptom, a polyp will be found more often than the combined lesions of these organs that would be expected to bleed.

Polyps are usually mentioned as a possible source of blood in articles which deal with the subject of blood in the stools of infants and children. Discussions which enumerate the clinical types of polypoid disease of the colon and rectum usually omit the childhood variety. Polyps of the colon which occur in children should be included in any discussion of the discrete type of polypoid disease. The condition occurs with moderate frequency and complicating conditions are often superimposed.

Reports in the literature have dealt frequently with polypoid disease of the large bowel in adults. Probably two clinical types will include all cases of polypoid disease mentioned in these reports. These types are (1) multiple polyposis of the familial type and (2) polypoid disease in which one or very few polyps are found. Cripps described "disseminated polyposis of the large bowel" in which a hereditary basis was evident.[1] Erdmann and Morris[2] classified this group as congenital or adolescent in type and those cases in which no heredofamilial predisposition existed they designated as acquired or adult types. This latter group, frequently referred to as discrete polyposis, has been observed most frequently. The incidence, symptoms, distribution and malignant potentialities of single polyps in adults are well known and opinion regarding them is generally unified. Considerable variation of opinion exists regarding their etiology, however. Several authors have expressed the opinion that they are true tumors.[1,3,4]

In order that some of the clinical and pathologic features of the disease as it appears in children might be correlated and compared with the discrete type of polypoid disease as it occurs in adults a review of our records of children examined during recent years was made. The group of children comprising this study consisted of one hundred consecutive patients in whom one or more adenomatous polyps or lesions arising from them were found in either the rectum, colon or in both. While no data are available from our records to indicate the incidence of colonic or rectal polyps in general childhood population, knowledge of the frequency with which they occur in children who present symptoms referable to the colon or rectum may be gained from the following statistics: A total of 349 children including those with polyps was examined. In 106 examination revealed no abnormal findings although in nineteen a polyp was strongly suspected because of the history. Anal fissure, anal ulcer or a para-anal abrasion was found in fifty-nine instances; congenital deformities in twenty-seven; prolapse of the rectum in twenty-four; abscess or fistula in twenty and an ulcerative process which involved the mucosa of the rectum or rectum and sigmoid was observed in thirteen. Of the 349 patients there were one hundred in whom polyps were discovered and the single symptom common to all was the painless passage of blood-streaked mucus from the bowel. In many patients this was the only symptom. If a fissure was present, some sign of discomfort was usually observed by the mother of the patient. This statement is mentioned because of the frequency with which parents are told by physicians that rectal bleeding although painless may be owing to the existence of a fissure.

As a rule bleeding from a polyp occurs intermittently and weeks may intervene between episodes. In this group the history of bleeding covered periods from a few days to several years. The average duration of symptoms appears to be of no great significance in this series because a surprisingly large number of children had bled for well over a year while mothers were assured frequently that this sign probably was of no significance. It was fre-

* From The Department of Proctology, Southwestern Medical College, Dallas, Tex.

quently the anxiety of the mothers that led to adequate, early examination of their children. The passage of small clots of blood occurs frequently. Blood in an amount sufficient to cause alarm occurred in a few instances. The source of these hemorrhages usually was the pedicle stump of a polyp from which all or a large portion of the body of the polyp had sloughed away. Self amputation occurs frequently in children but rarely in adults. It occurred in eighteen patients of this group. It is not unusual for a mother to find polyps which have been extruded through the anus of a child.

In sixty-eight patients a single polyp was found and thirty-two patients had more than one. Usually there were only two or three when multiple polyps existed and in only one patient resemblance to heredofamilial polyposis was observed. This patient was a three year old boy who had ten or twelve polyps in the terminal 25 cm. of his colon which varied in size up to ½ cm. in diameter. Throughout this area there were also numerous areas of thickened mucosa which presented the gross appearance of hyperplasia. X-ray examination of his colon revealed a polyp 1 cm. in diameter in the transverse colon and several small polyps in the cecum. This child's father had undergone right colectomy for carcinoma when he was thirty-four years of age.

Ninety-eight of this group of one hundred patients with polyps were eleven years of age or younger. One patient was twelve years of age and one was twenty-four and were included because of significant histories. The average age including the two oldest patients was 3.4 years. Ninety-four patients were five years of age or younger. The youngest child in whom a polyp was found was nine months old. There were fifty-six boys and forty-four girls in the group. Symptoms other than the passage of bloody mucus were, in the order of their frequency: protrusion of the polyp in 28 per cent; diarrhea in 19 per cent and abdominal cramps in 18 per cent.

Protrusion of polyps situated near the anal outlet is not an unusual complication but in several patients of this series protrusion occurred when the polyp was situated 10 or 12 cm. above the anal outlet. In one four year old child protrusion with intussusception occurred and it was found that the polyp was attached 25 cm. above the anal outlet. In children, prolapse of the rectum can usually be differentiated from protrusion of a polyp by the history and the dark, port wine color of the protruded polyp is easily distinguished from the familiar color and configuration of rectal prolapse.

True diarrhea is not an uncommon symptom when a polyp is present. In a few instances in this series oral medication was administered over long periods of time in an effort to allay the stool frequency. The proximity of the polyp to the anal outlet as well as the frequency with which large doses of mineral oil preparations were given with the intent of checking the bleeding by softening the stool, make the evaluation of this symptom possess doubtful significance.

Abdominal cramps varied in intensity with the size of the polyp and its location. Cramps were severe in three cases and affected the lower portion of the abdomen. Every child who had a polyp situated 25 cm. or higher above the anal outlet complained of this symptom and usually discomfort was severe.

In thirteen patients one or more polyps were present which could not be visualized through a proctoscope 25 cm. in length and were diagnosed by roentgenographic examination of the colon. Eight of these also had one or more polyps which could be visualized on proctosigmoidoscopy. The diagnosis of polyps of the colon and rectum depends upon an adequate examination which includes proctosigmoidoscopy and roentgenographic examination of the colon. Frequently each of these procedures must be repeated. This is particularly true of examination by roentgenography. However, if symptoms are significant, one should never fail to repeat these examinations. If the painless passage of bloody mucus persists, the physician should assume that a polyp is present until he can prove otherwise. One negative examination is not necessarily conclusive. One child in this group continued to pass blood-tinged mucus after two polyps had been removed from the rectum and lower portion of the sigmoid. Another polyp was found in the descending colon on the fourth x-ray examination of the colon. Careful preparation of the bowel is essential prior to each examination. Poor preparation can defeat the purpose of the examination.

In this group of one hundred cases each of the following serious complications was en-

countered one or more times: severe bleeding, anemia, obstruction, intussusception and carcinoma. Definite indication exists, therefore, for the removal of these lesions when found and this dictum applies to those polyps beyond the reach of the proctoscope as well as those which can be visualized through that instrument. Removal may be accomplished by electrofulguration when polyps lie within the terminal 25 cm. of the colon and by colotomy when above that segment of the large bowel.

In children these lesions are adenomatous and on microscopic examination present a gland pattern which always seems to be well preserved and appears like normal colon mucosa. Goblet cells are very numerous and cell nuclei are small. In adults about one-half of the polyps have the same appearance on section as those in children. The others have fewer goblet cells; nuclei tend to be larger and gland reproduction is not accomplished as well. In a certain few definite anaplastic changes are present in the epithelium but no invasion is present. An inflammatory reaction may be present in either the childhood or adult type of polyp but there is no evidence that either lesion if it is a true adenoma is dependent upon this reaction for its origin. That they are true neoplasms and not the result of a localized or diffuse inflammatory reaction seems to be a logical conclusion.

Although we do not have reason to believe that the tendency for malignant change to occur in polyps of childhood is as great as it is in those of adults, one cannot dismiss this possibility. Two patients in this group, with untreated polyps, developed malignant lesions at an early age and from the history of each patient little doubt can exist that the cancer was superimposed upon a polyp of long-standing. One of these patients, a twenty-four year old male, gave the following history: Since he could remember, a mass which frequently bled protruded from his rectum following each defecation. Six months prior to his first consultation regarding this condition the protrusion stopped although bleeding had continued. Examination revealed a lesion of the anterior rectal wall which was 3 cm. in diameter and its lower border was 2 cm. above the mucocutaneous junction. Biopsy revealed a grade II mucoid adenocarcinoma. A one-stage abdominoperineal resection was performed and regional lymph nodes were found to be involved. The patient lived approximately eighteen months following the operation.

The other patient, a twelve year old boy, was admitted to the hospital suffering from partial obstruction of the large bowel. Similar attacks had recurred at intervals during several months prior to his admission. An appendecomy had been performed previously during one attack. When seen on this last admission, the obstruction prevented a thin suspension of barium which had been injected into the rectum from passing proximal to the sigmoid lesion. His past history revealed that since the age of three or four bloody mucus had been passed repeatedly and that lower abdominal, cramping pains occurred frequently. In ten days under a medical regimen his obstructive symptoms were relieved sufficiently to permit an operation which was directed to the obstructing lesion rather than proximal to it. Perforation of the lesion and firm fixation to the left side of the parietal peritoneum had occurred and metastasis had extended to the regional lymph nodes and liver. As a palliative procedure the lesion was freed from the abdominal wall and a modified Mikulicz procedure was performed. The patient lived approximately ten months.

SUMMARY AND CONCLUSIONS

Bleeding from the bowel in children strongly suggests the presence of an adenomatous polyp. During the earlier years these polyps are usually of the non-familial discrete type.

The examination of 349 children presenting bowel symptoms disclosed the presence of one or more polyps in one hundred instances. The painless passage of blood-tinged mucus was the single symptom common to this group.

Protrusion of the tumor from the anus does not determine accurately the height of its attachment.

The diagnosis depends upon adequate examination which includes proctoscopic examination and repeated roentgen ray studies when necessary.

The possibility of malignant degeneration and of other serious complications including anemia, obstruction and intussusception constitutes a definite indication for removal of the lesions.

Removal may be accomplished by fulguration if the lesion is situated within 25 cm. of the

anal outlet and by colotomy if it is above that level.

REFERENCES

1. COFFEY, R. J. Multiple adenomatosis of the colon. *Proc. Staff Meet., Mayo Clin.*, 13: 741–742, 1938.
2. ERDMANN, J. F. and MORRIS, J. H. Polyposis of the colon. *Surg., Gynec. & Obst.*, 40: 460–468, 1925.
3. SWINTON, NEIL W. and WARREN, SHIELDS. Polyps of the colon and rectum and their relation to malignancy. *J. A. M. A.*, 113: 1927–1933, 1939.
4. HELWIG, E. B. Evolution of adenomas of the large intestine and their relation to carcinoma. *Surg., Gynec. & Obst.*, 84: 36–47, 1947.

DISCUSSION

ROBERT TURELL (New York, N. Y.): It is both a privilege and a pleasure to discuss Dr. Kerr's paper, dealing with one hundred instances of colonic polyps in juveniles, of which only one may have been of the heredofamilial type of polyposis. The finding of colonic polyps in 100 out of 349 children who presented intestinal symptoms is considerably higher than the one I obtained in a comparable series of adults.

Dr. Kerr's high yield of polyps in juveniles raises two pertinent questions: (1) The possibility of spontaneous regression or sloughing of colonic polyps in children and (2) the possibility of the existence of some specific causative factors in the Dallas series, future search for which may well shed some light on the formation of polyps in general.

Bleeding, as emphasized, is an important symptom, while protrusion is a significant sign. Protruding polyps may originate a long distance from the anal outlet. These either protrude by virtue of their long pedicle or because of the spontaneously reducible prolapse or even intussusception of the sigmoid into the rectum. The foregoing also holds true for digitally palpable but non-protruding polyps.

The fact that thirty-two of Kerr's patients had more than one polyp imposes an obligation upon us to search for additional polyps whenever one is discovered. The search includes proctosigmoidoscopy and repeated roentgenographic examinations.

As emphasized, polyps may undergo noninvasive and/or invasive malignant degeneration. I have encountered sessile polypoid lesions the centers of which were the seat of an invasive adenocarcinoma that was flanked on each side by histologically proved benign adenomatous polypoid tissue. These are perfect examples of adenocarcinoma developing in a benign adenoma.

As indicated, polyps that are situated within the terminal 25 cm. of the colon may be eradicated by surgical diathermy. The long-pedicled variety may be removed safely by means of an electrosurgical snare. Medium- or large-sized sessile or short-pedicled adenomas that cannot be looped safely by a snare wire may be removed expeditiously and effectively by means of a double-loop electrosurgical resector.

Of course, polypoid lesions situated above the reach of the sigmoidoscope are removed transabdominally by appropriate surgical procedures.

J. MILTON STOCKMAN (Knoxville, Tenn.): There are some very interesting ideas given us by Dr. Kerr's paper. First, in this series of one hundred cases of polyps in children, he reports two who developed carcinoma following a definite polyp history. The occurrence of these carcinomas took us into the third decade of life. In checking over the percentage of carcinomas in this region we find that roughly 4 per cent of those discovered occurred within the first thirty years of life. It makes us wonder if, by early diagnosis and eradication of these growths, we may not hope to reduce carcinoma markedly in this age group. It is very true that all polyps do not undergo malignant changes but we know that carcinoma in the young is very rapid and the chances of prolonged survival are very poor.

I would like to emphasize the ease of diagnosing a majority of these polyps in children. Fully 70 per cent occur near the rectosigmoidal juncture. The lower bowel of the child is more mobile than that of the adult and, due to the shallow buttocks, one is able to palpate well beyond the valves. The type that we usually find is a true adenoma and quite easily felt, whereas the papillomatous type rarely occurs in children. These are the spongy, soft tumors that are difficult to feel (Binkley). The squatting position facilitates palpability over an even higher area, and with straining enables those situated higher on long pedicles to descend.

Dr. Kerr has emphasized that each patient gave a history of painless bleeding and I do not think that we can say this too often. We like to think of blood streaking of the stool as a diagnostic sign while blood-streaked mucus is a suggestive sign.

In our experience we seem to meet prolapsing of the rectum complicated by a polyp more frequently than in this report. Schwartz, Goldberger and Crockett state that a polyp is "frequently the etiology of the prolapsing of the rectum." Our ratio is approximately one to three, and we never instigate treatment of this condition until we are relatively sure there is not a complicating polyp.

In our opinion this paper is a distinct contribution to the series that has been presented to this society over a period of years and should make us more cognizant of the occurrence of polyps in all age groups and urge us on toward early removal. Although on several occasions the parents have come in with evidence to show that the polyp has sloughed and a perfectly good operation has been ruined, I believe that we should check these areas

at the time for a possible bleeding or incomplete slough, and recheck every six months for either additional polyps, as advocated by W. J. Martin, or the recurrence, as suspected by Swinton and proved by the rare pyogenic polyp as reported by Tom Smith.

In conclusion, may I say that throughout this discussion, I wish in no way to minimize the use of the sigmoidoscope and x-ray studies as diagnostic aids.

JACK G. KERR (closing): I appreciate the discussion of Dr. Turell and Dr. Stockman. I agree with them that a considerable number of these lesions will slough from their attachment and be extruded. I think this happened in approximately nineteen of the patients studied in this group. Frequently this is the explanation for the single episode of melena that occurs in children who have had no previous symptoms referable to the colon. A significant amount of blood may be passed and concrete evidence of a polyp having sloughed may be furnished by the mother who has recovered the tumor following its expulsion.

Dr. Stockman mentioned that, if possible to reach it by sigmoidoscopy, the area from which the polyp sloughed should be examined. I think this precaution is important: first, because the pedicle may continue to bleed and, secondly, the adenomatous tissue may not separate completely and the small remaining nidus will be responsible for a recurrence of the polyp. Light fulguration of the area usually controls either situation.

One other thought about the diagnostic use in children of a barium enema: It is of practical value that the enema follow rather than precede the removal of all polyps visualized through the sigmoidoscope. Should a polyp be found by x-ray methods after those in the distal 25 cm. of the bowel have been removed, it is immediately apparent that laparotomy will be necessary for its removal.

The routine use of a barium enema in each patient immediately following removal of all polyps in the distal 25 cm. of the colon is perhaps not mandatory as once considered. If polyps are present, symptoms will be observed if the mother is properly and adequately instructed. In only those patients whose symptoms continue are barium enema studies advised.

TREATMENT OF HEMORRHOIDS

G. Johnson Hamilton, M.D.
New York, New York

LYNCH and I have long believed that many hemorrhoids were being excised which might be better treated by sclerosis or palliative measures. To test this hypothesis it was decided to study the records of a large enough group of consecutive cases of internal hemorrhoids seen in our private practice to shed some light on the following points: (1) the end result of hemorrhoids treated by the three methods mentioned heretofore; (2) the symptoms which brought the patient to the doctor; (3) the associated pathologic disorders both local and general; (4) the complications which resulted from the treatment whether postoperative, post-injection or palliative; (5) an evaluation of a combination of methods.

For the purpose of this investigation it was decided to consider only internal hemorrhoids which are definite varices of the superior hemorrhoidal vessels; and that where these masses were confluent, they would nevertheless be described as made up of their component major vessels. Thus, a hemorrhoidal mass extending from one through five o'clock would be considered as three individual hemorrhoids arising at one, three and five o'clock, twelve o'clock being anterior. Secondly it was agreed that their etiology should be accepted as follows: Some degree of stasis is prone to occur in the long column of blood extending from the rectum to the liver especially since these veins have no valves. This leads to a local rise in venous pressure with increased carbon dioxide and decreased oxygen content. This together with the sluggish removal of toxins tends to injure the walls of the veins. Continuation of this condition leads to the replacement of the intima and muscle cells by fibrous tissue. The occurrence of any great stress or strain or even a persistence of lesser strain causes these weakened walls to become stretched and tortuous. As the insults are continued the walls become thickened and the lumen relatively small.

If this hypothesis is accepted, it is obvious that anything which increases the local venous pressure will tend toward the production of a hemorrhoid. Furthermore this increase in local pressure may be due to a general condition such as cardiac insufficiency, hepatic congestion or to a local condition such as pressure from a mass in the pelvis including a pregnant uterus. Also, it is obvious that to the delayed elimination of toxins and products of metabolism may be added the presence of unusual quantities of either due to systemic diseases. In like manner it is obvious that poor grade veins will succumb to less trauma than would damage normal ones. Hence the diathesis toward the formation of hemorrhoids may follow the mendelian laws.

It was decided that local and general disorders should be eliminated as far as possible before deciding upon the treatment of hemorrhoids. The rules laid down for the treatment of hemorrhoids were as follows: Those hemorrhoids which were sufficiently thick-walled to be palpable were to be treated by excision. Hemorrhoids which were impalpable but visible and produced symptoms were to be treated by sclerosing therapy. Those which were impalpable and asymptomatic although visible were to be treated palliatively. Needless to say certain hemorrhoids which should have been excised were first injected to control bleeding until a convenient time for operation arrived.

To find 100 patients treated by sclerosing therapy it was necessary to study the charts of 278 consecutive patients in whom 951 individual hemorrhoids were described. The remainder of this series was made up of 111 patients who submitted to operation and sixty-seven who were seen in consultation only.

FINDINGS

Symptoms. Bleeding brought 181 of these patients to our office. It was the sole complaint in fifty-one cases and in none of these was there any associated local disorder. Prolapse was the major symptom in 108 patients and was associated with painless bleeding in fifty-four cases; 107 patients complained of pain. Pruritus ani was the sole symptom in two cases and was mentioned by seven other patients as one of

several complaints. However, changes in the perianal skin similar to those observed in patients who suffer with pruritis ani were seen frequently.

Additional Local Conditions. Fissures were present in ninety-one cases, thrombosis in twenty-eight, hypertrophied papillae in twenty-six, inflamed or torn crypts in seventeen, fistula in ten and adenomas in nine. It is interesting to note that all of the adenomas were asymptomatic.

SURGERY

The technic employed in these cases was simple ligation and excision of the involved superior hemorrhoidal vessels and then the inferior hemorrhoidal vessels if necessary. Plain No. 1 catgut on a small curved needle and small hemostats were used. Every effort was expended to avoid traumatizing tissue. The patients were prepared by several daily corn starch enemas before admission to the hospital. No enema was administered within twenty-four hours of operation A general diet was permitted. With the patient in the left Sims or lithotomy positions the operative area was cleaned with 10 per cent tannic acid in alcohol. Whenever there was no severe infection, the area was infilterated with ½ per cent novocain and this was followed by the injection of 10 cc. of anucaine. This procedure was followed in seventy-eight cases.

Like all oil soluble anesthetics anucaine must be injected with considerable care to avoid pooling and a resultant pressure necrosis. It is used by us only to prevent postoperative pain and, therefore, only in those cases in which none of the fibers of the sphincter are divided since the effect of the anesthetic is produced by preventing spasm of the anal sphincters.

During the war more than 4,867 operations on my service was performed under sodium pentothal anesthesia. I was greatly impressed with the value of this anesthetic and its safety but I believed that a competent anesthetist should always be in attendance and should be prepared to insert an endotracheal tube if necessary. In this large series of cases no complication considered worthy to record was encountered. Laryngeal spasm is of minor significance provided that an anesthetist is competent and properly equipped. Therefore, I have not used local anesthesia since my return although I still use anucaine for the prevention of postoperative pain.

Upon return to the bedroom the patient should be urged to urinate before falling asleep. It is our belief that much postoperative retention of urine is due to the fact that the patient falls asleep in a semi-drugged state and does not appreciate the desire to micturate until the bladder is overdistended. The patient should be informed that ample sedatives have been ordered but will be given only if requested; that the diet is unrestricted and that bathroom privileges are permitted. Patients are invited to smoke and have a highball if they desire. In fact, 10 gr. of aspirin and 2 ounces of whiskey are frequently more efficacious than ¼ gr. of morphine.

COMPLICATIONS

In this series of 111 cases one patient failed to void at the end of twelve hours and was catheterized once. Hemorrhage never occurred. Three patients developed abscesses of the posterior triangular space. It is interesting to speculate as to their cause. The first developed two weeks after the patient's discharge from the hospital and two days after she had slipped while attempting to adjust a window shade and severely contused the perineum. The second patient presented himself because of an external thrombotic hemorrhoid situated at five o'clock and I am by no means sure that the abscess was not present and missed although an error in the injection technic cannot be excluded as a causative factor. The third abscess was in relation to an undiagnosed fistula at six o'clock which was considered even at operation to be merely a fissure. However, when the abscess did appear and was incised, the thick fibrotic tract of the fistula was readily palpable and must have existed long before the operation.

In two instances the hemorrhoidal stump failed to slough because the ligature was only tight enough to prevent hemorrhage. Both stumps were destroyed by fulguration in the office and the procedure was accomplished painlessly without anesthesia.

SCLEROSING THERAPY

Many technics have been advocated for the injection treatment of hemorrhoids and many of them have produced admirable results in the hands of their advocates. We do not propose to

urge anyone to adopt our method provided theirs is giving satisfactory results. The technic we utilize is as follows:

The patient is placed in the Hanes position and a Tuttle proctoscope is inserted. This is a cylindrical instrument without a bevelled edge and, therefore, does not distort the existing condition. It has a distal light and so does not interfere with the operator. The site of injection is cleansed with 10 per cent tannic acid in alcohol and the injection is made with a 3 cc. Luer Lok syringe fitted with a No. 19 gauge needle 4¾ inches long and filled with a 5 per cent solution of phenol in almond oil. The injection is given at the cephalad point of origin of the hemorrhoid and into the sub-

TABLE 1

OBSERVED MORE THAN FIVE YEARS

Case No.	Complaints	Hemorrhoids Diagnosed	Additional Local Disorders	Contributing Factors	Hemorrhoids Excised	Hemorrhoids Injected	Injections per Hemorrhoid	No. Visits	Date Last Examined	Years Since End of Treatments	Complications
5549	Pain	1	Fissure	0	1	0	0	10	1/12/48	10	
5564	Blind, dizzy	1	0	Neuropsychosis	0	1	1	1	12/20/47	7	
5581	Bleeding	2	0	0	0	2	2	4	3/16/42	7	
5613	Prolapse, bleeding	2	0	0	2	0	0	0	12/30/47	11½	
5617	Pain	3	Fissure	0	2	0	0	11	12/21/47	12	
5631	Pain, prolapse	3	Fistula, fissure	0	1	0	0	18	2/20/46	10	
5663	Prolapse, bleeding	4	0	0	0	1	1	120	5/7/47	11	Refuses operation
5671	Pain, bleeding	4	Fissure	Constipation	4	0	0	22	10/2/47	10	
5673	Prolapse, bleeding	5	Crypt	Epithelioma	0	0	0	5	5/14/43	5	
5695B	Bleeding	2	4 Papilla	0	0	2	1	4	8/6/47	10	
5735	Bleeding	3	0	0	3	1 1 mo. later	1	9	11/13/46	10	New pile
5751	Bleeding	2	0	0	2	0	0	8	6/6/46	9	
5766	Prolapse	3	Fissure	0	3	0	0	12	11/8/46	9	
5778	Pain	3	Polyp, fissure	0	0	1	1	1	12/12/47	10	
5786	Pain	4	Fissure	0	4	0	0	20	12/15/47	10½	Mucosal stricture—relieved by one massage
5794	Prolapse, bleeding	4	Fissure	0	4	0	0	18	9/22/47	9½	
5806	Bleeding, prolapse	4	0	0	3	0	0	12	1/10/48	10	
5810	Bleeding	4	0	0	2	0	0	13	9/26/47	10	
5818	Pain, bleeding	3	Fissure	0	2	0	0	14	9/10/47	10	
5921	Prolapse	5	0	0	0	4	4 × 1 (failed) 1 × 3	12	10/18/46	7½	Refused operation
5983	Pain, bleeding	5	Fissure	0	2	0	0	10	3/17/47	6	
6043	Pain	5	Fissure	0	0	2	1	21	9/13/46	7	Refused operation
7002	Bleeding	4	Papillas	0	0	3	2 × 1 1 × 1 (1 failed)	8	3/14/47	7	Refused operation
7126	Pain, bleeding	3	Fissure	0	0	2	1	5	3/26/42	5	Refused operation
7139	Bleeding	3	Adenoma, fissure	0	3	0	0	15	2/24/47	7	
7159	Prolapse, bleeding, pain	4	Papilla, crypt, fissure	0	3	0	0	29	7/14/47	7	
7201	Prolapse, bleeding	4	0	0	3	0	0	21	12/19/47	6	Abscess in 10 days
7281	Pain	4	Thrombosed	0	0	2	1	9	1/8/47	5½	
7289	Bleeding	4	0	0	0	4	1	9	9/5/47	6	
7301	Bleeding	3	0	0	0	3	1	3	12/20/47	6	
7324A	Prolapse	4	0	0	4	0	0	12	10/2/47	6	
7324B	Pain	4	Fissure	0	4	0	0	30	1/21/46	5½	Recurrence
7435	Bleeding	4	Papilla	0	0	3	1	4	9/12/47	5	

mucosal layer. One can determine that the needle is in the proper layer by observing the free motility of its point. Any fibrosis limiting this motility or impeding the injection is a contraindication to this form of therapy because of the danger of pressure necrosis and the possibility that hemorrhage may result. Should a hemorrhage occur, surgical intervention is contraindicated since the extreme friability of the tissues makes its success unlikely. Hemostasis should be obtained by pressure after which a hot enema (110°F.) should be administered. The injection should be given very slowly and continued until striae are visible on the surface of the mucosa but stopped before blanching occurs. Rarely, and as a palliative measure, 15 per cent phenol in almond oil may be injected into the stalk of a polypoid hemorrhoid. We prefer to inject one hemorrhoid at a time at weekly intervals. Frequently one hemorrhoid may require two or even three injections. No hemorrhages, sloughs or abscesses occurred in our patients who received the injection treatment.

EVALUATION OF METHODS

The efficacy of a procedure can be determined only by following a large series of cases over a long period of years. This we have found most difficult to do. In less than one year 207 cases disappeared from our ken and of the entire series of 278 patients it was possible to follow only thirty-three for more than five years. However, most of these continue to come in for their semi-annual check-up and have been studied for eight to ten years. Of this group nineteen submitted to surgery and fourteen were treated by injection. In the surgical group sixty-five hemorrhoids were observed and fifty-two were excised. Of the remaining thirteen none have needed surgical excision and only one has had to be reinjected. In the fourteen patients treated by sclerosis forty-seven hemorrhoids were observed and thirty-one injected. Of the remaining sixteen one was injected later. In other words this small group of thirty-three cases (Table 1) presented 112 hemorrhoids of which twenty-nine were treated palliatively and there were only two failures. Expressed in another manner 25 per cent of the damaged veins were not removed and have remained asymptomatic for more than five years.

CONCLUSIONS

It is worth while to judge each individual hemorrhoid on its own merits. Surgery, injections and palliation all have their respective places in the armamentarium of a proctologist.

DISCUSSION

JOHN CHELEDEN (Philadelphia, Pa.): Dr. Hamilton has presented us with a thought-provoking topic with many points for discussion. Within the limited time available only one or two items can be stressed.

After receiving and studying Dr. Hamilton's report, I conferred with several of my colleagues at Jefferson Hospital. Two of the men are now completing a ten-year survey comprising 1,000 individuals with a follow-up of over 50 per cent of the patients. I have their permission to use some of the figures in a report as yet unpublished.

The following is a pooled summary of the opinion of the members of our department regarding this point: Whereas ten years ago we were injecting hemorrhoids in over 50 per cent of all individuals with symptoms, that figure has decreased gradually so that in the past year 25 per cent or less of all hemorrhoids receive the injection form of therapy. We arrived at our conclusion only after study of a large group of patients carefully watched over a long period of time.

We believe, just as Dr. Hamilton does, that it is worth while to judge each individual hemorrhoid on its own merits. We admit that at times we have been surprised at the results obtained with injection of some hemorrhoids that were designated as requiring surgery at the time of initial examination, but the patients refused surgery. Careful follow-up of this group, however, revealed that the recurrence rate was too high and that subsequent injection or surgery was eventually carried out.

We cannot agree with the premise that many hemorrhoids are better treated by sclerosis or palliative injections. In a few instances, injections may give as good a result but never a better one than careful excision. In too many instances following injection, we never feel as secure as we would following excision.

KENNETH E. SMILEY (Los Angeles, Calif.): I want to compliment Dr. Hamilton on the completeness of this detailed statistical report. It is a difficult and tedious task to review a large series of cases and to evaluate the results, and it is difficult to follow any large series for five years or more is indicated by his charts. I am sure that it would benefit all of us if we could follow a fairly adequate number of cases for several years, but I am inclined to believe that we should be able to make an unbiased evaluation of our work as we go along

and that we should reach conclusions that are accurate. My own opinions are based on such observations but I am not able to produce statistical data to substantiate these opinions.

To me visualization of hemorrhoids is a much more accurate method of determining their characteristics than their palpability or non-palpability. The vessels are so easily compressed by the palpating finger that little information is gained, and I would not care to rely on that to determine the type of treatment necessary. In fact, there are many other factors that should be considered, such as age, general health, occupation and bowel habits, but I realize that it would be difficult to evaluate them in a statistical study.

Long ago I decided that the exact method of removal of hemorrhoids is not of great importance. Dr. Hamilton has described an adequate, simple method which gives excellent results with a minimum of complications. The use or non-use of anesthetic agents in oil for subcutaneous injections will probably remain a controversial subject for some time. It seems to me that the abscesses are of frequent enough occurrence, and the trophic disturbances with resulting delay in healing of enough consequence to contraindicate the use of such anesthetic agents and to rely on other means to control postoperative pain.

It is my opinion that the treatment of hemorrhoids by the injection of sclerosing solution has perhaps fallen too far into disrepute, and I am glad that Dr. Hamilton has again brought the method to our attention. My own opinion in the matter is that few if any hemorrhoids are cured by injections but that in properly selected cases the symptoms can be controlled for varying periods. I can see no objection to such treatment if the operator fully understands the shortcomings of the method and if the patient is frankly advised as to the results he may expect.

It is certainly true, and well borne out by Dr. Hamilton's paper, that small, bleeding, uncomplicated, internal hemorrhoids can usually be controlled for a considerable length of time by the injection of sclerosing solution. On the other hand, the injection treatment of large hemorrhoids, or those complicated by other conditions should not be attempted under ordinary circumstances for the results are poor and the inevitable surgical treatment is made more difficult for both the patient and the surgeon.

Robert V. Terrell (Richmond, Va.): The subject of hemorrhoids is one that I cannot let pass without saying a word. Things have been said here this morning about the injection treatment which I believe I must defend. I enjoyed the paper very much and agree with Dr. Hamilton's remark that the treatment must be tailored in each case to suit the pathologic condition and there is no one treatment that can be expected to cure all types of hemorrhoids.

The statement has been made by the discussers, however, that the injection treatment does not cure permanently, and with this I wish to take exception. Approximately 75 per cent or more of the hemorrhoids that I am now seeing are being treated by the injection of quinine urea HCl exclusively. As many of you know, we have been doing this in Richmond for a long time and see very few recurrences.

In properly selected cases the only reason that hemorrhoids should recur after treatment is that the treatment was not continued long enough. In other words, treatment must not be discontinued just as soon as the symptoms disappear, but must be continued until the internal hemorrhoids are actually observed to disappear completely. The patient who has internal hemorrhoids and no other anorectal disorder is advised that he may expect a cure by the injection method fully as complete as if the hemorrhoids had been surgically removed.

Treatments are given at intervals of one to two weeks and each internal hemorrhoid is injected at each visit. The hemorrhoidal mass will be seen to grow smaller with each injection until eventually it will disappear altogether although bleeding and protrusion usually cease after the first injection. Occasionally a patient will conclude that he is cured and discontinue treatment as soon as freed of symptoms; in such cases recurrence is to be expected.

A hemorrhoidectomy is, of course, indicated when both internal and external hemorrhoids are present, but when internal hemorrhoids only are present surgery is unnecessary. Surgery means loss of time from work as well as greater expense and discomfort to the patient and there are sometimes undesirable sequelae such as skin tags and abscesses. Dr. Hamilton records an incidence of postoperative abscesses of nearly 3 per cent which is, of course, unusually high. Neither of these complications are seen following the injection method, nor do we see sloughs, infections or hemorrhages when the proper technic is used.

Finding hospital beds is currently so difficult that we are forced to treat many patients by injections who have clear indications for surgery; such patients are grateful for the temporary relief obtained and are advised to have surgery later on when a hospital bed can be found. In summary, I would like to say that we believe that failure to obtain a lasting cure by the injection method in suitable cases of uncomplicated internal hemorrhoids is due to inadequate treatment and that complications are due to errors of judgment in selection of cases or to poor technic.

Claude C. Tucker (Wichita, Kan.): In the majority of our cases we remove all of the diseased

tissue, including the external as well as internal hemorrhoids. By microscopic examination of the tissue we have found that 98 per cent of our cases have external as well as internal hemorrhoids. Ninety-eight per cent of our cases show infected anal ducts either acute or chronic which is the primary cause of the hemorrhoids. About 60 per cent of these cases show thrombi which are localized or extend around the anal margin. These thrombi are also caused by infection in the anal ducts.

Therefore, if you inject a sclerosing solution into internal hemorrhoids which have to swell before shrinking, you are blocking drainage from the ducts. Thus, you are holding the injection. Furthermore, when there are external hemorrhoids and thrombi, injections are contraindicated.

Louis E. Moon (Omaha, Neb.): I wish to take issue with some of those who have discussed Dr. Hamilton's paper.

I think that as far as the treatment of hemorrhoids is concerned, the removal of them is the proper treatment. It cannot and should not be done on every individual. We do occasionally see invalids and old people whom we have to treat by the injection method, but as a working rule, I think we, as representatives of the American Proctologic Society, should recommend the removal of hemorrhoids rather than the injection of them.

The injection treatment does not cure hemorrhoids, regardless of what anyone says. It does sclerose the vessels and it shrinks the redundant tissue for the time being and it allays bleeding, but in a year or two, or later, the circulation in the hemorrhoid is re-established and your redundant tissue is again present. This excess of tissue has to be removed before the hemorrhoid is cured. I do not believe that our Society should go on record as having said that the injection treatment of hemorrhoids is preferable to the operative treatment. I believe that all hemorrhoids should be removed; but if we do find a patient who cannot withstand an operative procedure, we can then suggest palliative measures and one of the palliative measures is the injection treatment. If we are to treat our patients properly, we, as proctologists, should not try to see how many hemorrhoids we can inject; but we should see that the treatment is proper for the patient and in most hemorrhoid cases the removal of the hemorrhoid is the proper treatment.

THE PROBLEM OF FOREIGN BODIES IN THE COLON AND RECTUM

F. GEORGE REBELL, M.D.
Los Angeles, California

RELATIVELY little can be found in the literature regarding the subject of foreign bodies in the terminal portion of the bowel. Infrequently a case is published but the attention it attracts is largely due to its bizarre nature and to the extraordinary circumstances associated with the introduction of the foreign body. The attempt has therefore been made to analyze the sites at which foreign bodies were lodged in a series of patients, types of objects encountered, resultant injuries with their possible complications and the methods employed for treatment and extraction.

Sometimes cases occur which present puzzling diagnostic problems, associated with a background of persistent anorectal or colonic symptoms. When carefully examined, it will be found that a foreign body is the cause of such a protracted morbid condition. Several instances of diagnostic difficulties of this kind will be presented. Twenty-four cases will be described involving different types of foreign bodies which lead to varying degrees of anorectal and colonic injuries. The majority of these cases were observed over a ten-year period on the proctologic service at the Los Angeles County General Hospital. The foreign bodies ranged from vegetables to oil cans and were introduced both intentionally and otherwise.

It is not unusual to discover portions of toothpicks embedded in an anal crypt, a condition which may lead to the formation of a fistula. Similarly, pieces of fish and fowl bones, small berry seeds, dental fillings and the like are also found. In many cases a foreign body in the distal portion of the colon is passed spontaneously and, therefore, never comes to the attention of the proctologist. Furthermore, the majority of persons are extremely hesitant about calling for assistance when complications arise after a foreign body has been voluntarily introduced into the rectum. Others may be unaware that the cause of their rectal complaint is due to a foreign body which accidentally entered the terminal portion of the colon either by way of the abdominal cavity, the rectum or orally through the gastrointestinal tract.

In the perianal region any external fistulous opening of doubtful origin should arouse suspicion of the possible presence of a foregin body in the rectal ampulla. Moreover, any foreign body entering the abdominal cavity by way of the rectum constitutes a decided danger requiring immediate surgical intervention. When surgical treatment is delayed for more than six hours, the risk is greatly increased. If, on the other hand, an early diagnosis is made and the patient is fortified with modern chemotherapy and especially with antibiotic therapy, the danger can be materially lessened.

The majority of self-introduced foreign bodies can usually be detected by digital palpation of the rectum. Such foreign bodies frequently lodge in the rectal ampulla which is the most spacious segment of the terminal portion of the bowel. It is only by actual force that most objects will pass through the rectosigmoid junction which fortunately acts as a valvelike barrier. However, any sudden act of abdominal straining such as coughing or sneezing will result in an increase of intra-abdominal pressure and may cause perforation. Sigmoidoscopic as well as x-ray examinations are invaluable aids in determining the location, size and character of the foreign body. The sigmoidoscope, however, should be introduced with extreme caution in order to avoid forcing the foreign body beyond reach or through the bowel wall.

One finding which was encountered several times in the present series should be taken as a warning, namely, that far too frequently trauma is produced through insertion of a thermometer or a rectal irrigation tip. Often the anterior quadrant of the rectal ampulla is lacerated by a rectal dilator causing profuse bleeding which assumes alarming proportions in many instances. Damage of various degrees was noted on several occasions, involving the prostrate gland and urethra in the male and

the rectovaginal septum in the female. Forceful insertion of any dilator, enema tip, thermometer or similar appliance into the rectum via the anal canal without adequate precaution invites trouble and possible fatal complications. For this reason nurses, orderlies and assistants in physiotherapy should be adequately instructed as to the relationship of the anal canal to the rectum. A good rule to follow is to insert the appliance always in the direction toward the umbilicus for the first 3.8 cm. and then to follow cautiously the curvature of the coccyx and sacrum which is practically at right angles to the direction of the first insertion.

The following outline the twenty-four cases of the present series:

CASE REPORTS

Case I. Upon pelvic examination a white female, fifty-three years of age, revealed a firm, indurated mass in the cul-de-sac attached anteriorly to the uterus and posteriorly to the rectum. The mass gave the impression of widespread, diffuse cellulitis infiltrating all adjacent structures. The possible presence of carcinoma of the broad ligament or of the rectum was at first taken into consideration. A barium enema, however, disclosed an indefinite, filling defect of the upper rectum which was thought to be of neoplastic origin.

Two years prior to this examination the patient had submitted to a pelvic operation after which she was told by her physician that due to her critical condition the operation had been interrupted in order to avoid sacrificing her life. Several months later the patient began to complain of bearing-down sensations in the rectum which gradually became worse. A progressive type of constipation including occasional obstipation added to her discomfort.

Sigmoidoscopic examination revealed a strictured area at the 11.5 cm. level. A marked degree of hyperemia and edema of the mucous membrane was also encountered. This condition was caused by two 4-inch gauze packs extending through a pelvirectal fistula into the rectum. Unquestionably these had eroded through the cul-de-sac following the operation two years previously. The packs were removed by long bronchoscopic forceps and only a moderate degree of bleeding ensued. Two small areas of tissue were removed for biopsy which were reported to be pyogenic granuloma of the rectum. Three months later the pelvirectal fistula was seen to be closing spontaneously and edema as well as inflammation had subsided. Constipation was corrected subsequently. This case proves that the cause of an obscure pelvirectal disturbance may be detected by proctoscopic examination.

Case II. A young adult male self-introduced a small vaseline jar with its cover into his rectum two days before entering the hospital. Manual removal was attempted without success. Under spinal anesthesia the sphincter ani muscle was divulsed manually while pressure was applied above the symphysis pubis and the jar in the rectal ampulla was grasped and delivered with obstetrical forceps.

Case III. A male, fifty-nine years of age, self-introduced a carrot into the rectum two hours before being seen at the hospital. Palpation disclosed a firm mass at the tip of the examining finger. Under pentothal anesthesia sigmoidoscopic examination was performed and the carrot was discovered in the rectal ampulla. The blunt end presented itself distally and was about 2 cm. in diameter. All attempts to deliver the object failed. The patient was finally returned to the ward because of his marked apprehension. However, several hours later he manifested severe abdominal symptoms and was rushed to the operating room. The carrot was found inside the abdomen lying above and parallel to the aorta. A transverse tear in the region of the rectosigmoid junction was noted through which the terminal 3 cm. of the carrot could be seen extending into the lumen of the bowel. Upon removal the carrot measured 26.5 cm. in length and 3.8 cm. in diameter. The large bowel was exteriorized through the lower end of the rectus incision and subsequently closed. The patient recovered after a stormy convalescence.

Case IV. A male, thirty-eight years of age, was admitted with complaints of insomnia, dizziness, restlessness and abdominal cramps which he attributed to liver pills. Upon rectal palpation a large, firm, immovable mass was located well above the sphincter ani muscle. Upon further questioning the patient admitted not having had a bowel movement for four days. X-ray revealed the open end of a tumbler facing downward with its base tilted slightly to the right. The tumbler was delivered with forceps which were applied cautiously while the patient was under spinal anesthesia. Moderate bleeding of the mucous membrane ensued. After extracting the object from the rectal ampulla an oil retention enema was administered to allay mucosal irritation. Any attempt to extract this glass object without proper anestheisa or as an office procedure undoubtedly would have resulted in breaking the tumbler, with resulting massive hemorrhage and possible perforation.

Case V. A male, forty-one years of age, on two previous occasions had self-introduced objects into his rectum. This time the patient had used an oil can with a potato stopper which he admitted had produced considerable bleeding at the time of insertion. The nature of the object was determined by careful digital examination of the rectum. The

TABLE I

Type of Object	Manner of Introduction	Site of Lodgment	Resultant Injury	Method of Extraction
Case I Two 4-inch gauze packs	Left at operation two years previously	Cul-de-sac attached to the uterus and the rectum	Strictured area, edema and hyperemia; erosion through cul-de-sac and into rectum through a pelvirectal fistula	Bronchoscopic forceps
Case II Small vaseline jar	Self-introduced	Rectal ampulla	Denuding of the mucous membrane with subsequent bleeding	Spinal anesthesia; pressure above symphysis; obstetrical forceps
Case III Carrot	Self-introduced	Abdomen	Transverse tear in the rectosigmoid junction	Surgically removed and tear repaired
Case IV Tumbler	Self-introduced	Rectal ampulla	Insomnia, dizziness, abdominal cramps, no bowel movement for four days	Spinal anesthesia; removed with forceps
Case V Oil can	Self-introduced	Rectal ampulla	Massive hemorrhage	Pressure on the symphysis pubis
CASE VI Teacup	Self-introduced	Rectal ampulla	Mucosal laceration	Removed in fragments with specula and sponge forceps
Case VII Chili bottle	Self-introduced	Rectal ampulla	No bowel movements for three days	Spinal anesthesia; deep pressure at the symphysis, finger manipulation
Case VIII Thermometer	Taking temperature of a child	Rectal ampulla	Moderate rectal bleeding	Passed spontaneously on bowel movement
Case IX Thermometer	Taking temperature of child	Rectal ampulla	Moderate rectal bleeding	Passed spontaneously on bowel movement
Case X Thermometer	Taking temperature of infant	Rectal ampulla	Not mentioned	Extraction with Allis forceps and index finger for guide
Case XI Toothpick	Swallowed	Cecum	Perforation and death	Discovered at postmortem
Case XII Large bottle	Self-introduced	Both ischiorectal fossae	Obstipation	After fragmentation the bottle was extracted
Case XIII Beer bottle	Self-introduced	At the level of the middle Houston valve	Generalized peritonitis	Incision in the rectosigmoid colon; proximal loop colostomy
Case XIV Coca-Cola bottle	Self-introduced	Rectosigmoid colon	Rectal hemorrhage with some clots	Laparotomy
Case XV Whiskey glass	Self-introduced	Rectal ampulla	Obstipation and partial obstruction	Manipulation and pressure above the symphysis pubis
Case XVI Wooden rectal dilator	Self-introduced	Rectal ampulla	Obstipation and partial obstruction	Manipulation and pressure above the symphysis pubis

TABLE I (*Continued*)

Type of Object	Manner of Introduction	Site of Lodgment	Resultant Injury	Method of Extraction
Case XVII Carrot	Self-introduced	Through the rectal ampulla into the sigmoid colon	Partial obstruction	Spinal anesthesia; grasped with uterine curet and uterine forceps
Case XVIII Test tube	Self-introduced	Rectal ampulla	Partial obstruction	Pressure above the symphysis pubis, two fingers in the rectum
Case XIX Vaseline jar	Self-introduced	Rectal ampulla	Complete obstruction	Spinal anesthesia; Kielland forceps to the anal margin, then large bone forceps
Case XX Whiskey bottle	Maliciously introduced	Rectal ampulla	Complete obstruction	With Rocker forceps and by manipulation and pressure above the symphysis pubis
Case XXI Glass tube	Not mentioned	Rectal ampulla	Partial obstruction	Spontaneously passed
Case XXII Rectal tube	Self-introduced	Transverse colon, after enema of proximal sigmoid loop	Death	Sigmoid colon opened and tube delivered; left sigmoidostomy; cause of death peritonitis and shock
Case XXIII Irrigation tube	Self-introduced	Sigmoid colon	Hyperemia; enlargement of the glands in the mesocolon	Surgery for exploration; the tube was milked down and grasped by forceps
Case XXIV Piece of bone	Swallowed	Left ischiorectal fossa	Pain, discharge, bleeding; abscess in the left ischiorectal fossa	Through an anoscope removed with Allis forceps

foreign body was delivered without anesthesia by pressure above the symphysis pubis. The oil can measured 7.6 by 7.6 by 6.3 cm.

CASE VI. On one of the previous occasions a large teacup, its edges broken and ragged, presented itself in an inverted position in the rectal ampulla. It was found to be impinged anteriorly near the pubic bone, posteriorly in the region of the coccyx and laterally to the ischial tuberosities. The cup was removed in fragments by employing two Sims' specula and sponge forceps. A small degree of mucosal laceration resulted from the extraction. Treatment consisted of instillation of half strength witch hazel three times daily. The object could be removed without anesthesia due to the patulous, relaxed and dilated condition of the anal outlet.

CASE VII. A male, fifty-six years of age, was admitted for proctologic attention after failing to have a bowel movement for three days. The patient stated that in order to initiate defecation he was accustomed to dilating the anal orifice with various objects which at this time had happened to be a chili bottle. Without anesthesia the bottle could only be brought down to within 2 inches of the anal outlet. Under spinal anesthesia deep pressure was applied at the level of the symphysis pubic while finger manipulation of the bottle was accomplished from below through a patulous anal outlet. The bottle measured approximately 2.5 by 15 cm.

CASES VIII and IX. In two cases thermometers were broken in the rectum while attempting to take routine temperatures of children, one four and the other seven years old. The thermometers were passed spontaneously upon bowel action followed by a moderate amount of rectal bleeding.

CASE X. Upon taking the rectal temperature of a six months old infant, a nurse broke the ther-

mometer in the rectum. It was extracted with Allis forceps using the index finger of the left hand as a guide.

Case xi. A male patient was admitted in shock, with a vague history obtained from relatives suggestive of symptoms similar to obstruction. The patient subsequently died. Postmortem examination revealed a perforated cecum caused by a toothpick.

Case xii. A male, fifty-four years of age manifesting symptoms of rectal disorder, was referred to the proctologic service. Digital examination revealed a jagged, irregular piece of glass which had burrowed itself into both ischiorectal fossae. This proved to be a large bottle measuring about 7.5 by 7.5 cm. and lying approximately opposite the sacral prominence. Exposure was accomplished by the use of two medium width Sims vaginal specula. After fragmentation by means of a large bone rongeur the rim of the bottle was grasped and very cautiously extracted. No intraperitoneal perforation of the rectum occurred.

Case xiii. Five years later this patient returned to the hospital. Upon this occasion he stated that he had inadvertently passed a standard 11 ounce beer bottle into his rectum while in the bathtub. He suffered considerable pain and complained of much abdominal tenderness. Palpation located the base of the bottle at the level of the middle Houston valve. Recovery of the bottle was attempted by way of the anal orifice using Kielland's forceps. Many other types of retractors were unsuccessfully tried even after the tip of the coccyx had been resected and the rectum split posteriorly in the anococcygeal line. Moreover, after a left rectus incision it proved impossible to force the bottle out of the rectum by intra-abdominal pressure alone. Finally the bottle was extracted and delivered through an incision into the rectosigmoid colon. Colostomy of the proximal loop was performed but failed to prevent generalized peritonitis. The patient recovered after a stormy convalescence.

Case xiv. A male, forty-three years of age who had been intoxicated for four days, developed a rectal hemorrhage of bright red blood with some clots. Diagnosis of a foreign body was made on palpation of the abdomen. A hard, movable mass in the form of a bottle could be outlined. Exploratory laparotomy disclosed no rents or tears in the sigmoid or descending colon. However, the contour of a bottle was plainly visible in the rectosigmoid colon, the base approximately 12.5 cm. above the anal outlet and the neck extending into the sigmoid. A small ecchymotic area was observed on the anterior wall of the sigmoid but no evidence of necrosis or perforation was encountered. The bottle was eased through the pelvis by compression of the sigmoid and gradually delivered through the rectum by gentle traction from below. The foreign body proved to be a Coca-Cola bottle. Early surgical intervention in this case was undoubtedly the cause of recovery.

Case xv. A male patient, forty years of age, lost a whiskey glass during one of his relaxed drinking moments. It was later found in his rectum and recovered without fragmentation of the glass by finger manipulation while pressure was simultaneously applied above the symphysis pubis.

Case xvi. A male, sixty-nine years of age, had yielded to the advertisements describing the benefits derived from the home use of a wooden rectal dilator. A short time later the dilator was recovered from the rectum by manual manipulation with simultaneous pressure over the symphysis pubis.

Case xvii. A male, forty-seven years of age, applied vaseline to a carrot and inserted it into his rectum for relief of itching piles. Thereupon he slipped accidentally and fell on his buttocks which caused the carrot to be pushed upward in the rectum out of reach. Under spinal anesthesia the carrot could be palpated with the tip of the index finger and the presenting end visualized by the use of Pennington's proctoscope. Various hemostats and other instruments failed to secure a firm grasp on the vegetable. Finally a sharp uterine curet was applied to the bulky stalk which facilitated grasping the lower portion with uterine forceps. The carrot was then cautiously extracted.

Case xviii. A male, fifty years of age, who had been suffering from constipation for several days attempted to relieve himself by inserting a test tube into his rectum which he was unable to recover later. By suprapubic pressure on the abdomen with two fingers inserted in the rectum the test tube was delivered without breaking. It measured 15.2 by 3.2 cm. and a cork stopper was found in its hollow end.

Case xix. A forty-six year old male with complaints of protruding hemorrhoids associated with intense itching tried to reduce them manually but failed. He next resorted to a vaseline jar with its cap (the cap end inserted first) to push the hemorrhoids back into the rectum. The jar became lodged in the rectum and all efforts of the patient to recover it were unsuccessful. A proctologic examination revealed that the jar was wedged transversely across the rectal ampulla at the level of the middle Houston valve. Under spinal anesthesia Kielland's forceps were used to retract the jar to the anal margin; then it was grasped with large, coarse-toothed bone forceps. No gross tears were made in the rectal mucosa and neither packing nor suturing was necessary. The jar measured about 6.3 cm. in diameter.

Case xx. A male, fifty-nine years of age, gave two hitch-hikers a lift in his car; and when he refused a social drink, they became angry and forcefully inserted a whiskey bottle into his rectum.

Upon careful proctologic examination a firm, solid object which felt like the bottom of a bottle could be palpated 10 cm. distal to the anus. No bleeding or abdominal symptoms were observed. The bottle was carefully extracted by means of Rocker forceps combined with manual manipulation as well as suprapubic pressure. When recovered, the bottle, 5 by 3.6 cm., was broken in two pieces.

CASE XXI. A male, thirty-seven years of age, was unable to recover a glass tube which he had inserted into his rectum. Various attempts to extract the tube manually failed but a short time later it was passed spontaneously.

CASE XXII. A female, sixteen years of age, stated that as long as she could remember she had been troubled with constipation and particularly with excessive flatulence. Relief could be obtained only by inserting a soft rubber rectal tube. About a month prior to admission the rectal tube got out of hand during insertion into the rectum and consequently remained in the colon. Since then she experienced difficulty at defecation and the abdomen became progressively more distended. Upon palpation of the abdomen a moveable, soft mass could be detected just above the level of the umbilicus. Before x-rays were made a tentative diagnosis of Hirschsprung's disease or megacolon was made. A flat plate of the abdomen, however, revealed a portion of the tube to be coiled in the transverse colon. Abdominal distention became rapidly more acute. A proctologic consultation was requested and it was found that a fecal mass was filling the entire rectal ampulla. Repeated retention enemas of warm oil were recommended; treatment, however, proved unsuccessful and only aggravated the situation. Upon operation an enormously distended transverse colon was encountered with fecal matter impacted around the coiled colon tube; this had migrated to the proximal segment of the sigmoid loop following administration of the oil enemas. The sigmoid portion of the colon was incised and the tube delivered. A left sigmoidostomy was performed proximal to the opening previously made and attached to the incisional wound below the umbilicus. The patient lived only a few hours and the cause of death was recorded as postoperative peritonitis and shock.

CASE XXIII. A female, forty years of age, after unsuccessfully attempting a colon irrigation lost the tube in her rectum. A flat plate x-ray of the abdomen showed the tube to be lodged in the sigmoid colon just below the promontory of the sacrum with the upper end directed toward the cecum. Exploratory laparotomy using a a left paramedian incision was performed. The sigmoid colon around the distal end of the colon tube revealed marked hyperemia and enlargement of the adjacent glands in the mesocolon. No evidence of erosion or ulceration through the bowel musculature was encountered. The tube was gradually and cautiously milked down into the rectum. When the tip entered the rectum, it was grasped with forceps guided by digital palpation and was successfully removed.

CASE XXIV. A male, seventy-eight years of age, one year prior to hospitalization consulted his family physician for piles which were accompanied by backache. A few months later throbbing, persistent pain developed near the rectal outlet associated with a discharge from the rectum. The patient stated that during the past month he had been aware of an occasional loss of bright red blood from the rectum. Bowel movements were regular without the use of cathartics. Proctologic examination gace evidence of a recently formed abscess in the left ischiorectal fossa. Two discharging sinuses separated from each other by a distance of about 3 cm. were seen approximately 3.5 cm. from the anocutaneous line. Upon digital examination a sharp foreign body was felt extruding from the opening of the primary fistula at the level of the crypt line in the left lateral quadrant. The foreign body was removed with Allis forceps through an anoscope and proved to be a piece of bone about 5 cm. long, 1.5 cm. wide and 5 mm. thick. The extruding portion of this bone was tapered to a fine point while the blunt end had been lying in the fistulous tract within the rectum. The abscessed crater was uncapped and the opening of the primary fistula excised. The canalized process of the tract was thoroughly cauterized.

SUMMARY

1. Foreign bodies which erode or rupture into the abdominal cavity require surgical intervention within six hours after manifestation of symptoms.

2. Self-introduced foreign bodies can usually be diagnosed by digital palpation and proctoscopic examination; roentgen study of the condition is a valuable adjunct.

3. Greater caution should be exercised when introducing thermometers, enema tips and other appliances into the rectum. Nurses, orderlies and assistants in physiotherapy should have precise knowledge of the anatomy of the rectal ampulla and of the anal canal in order to preclude accidents.

4. The indiscriminate use of rectal dilators and the wholesale practice of colonic irrigations by the general public are dangerous practices.

5. Perianal discharges of unexplained origin, sudden changes in bowel habits as well as acute abdominal symptoms call for thorough proctologic examination on the basis of a carefully collected history.

DISCUSSION

GASPAR ANGELO (Cambridge, Mass.): Dr. ReBell's paper has added a great deal to the medical literature on this subject. As Dr. ReBell stated the literature is abundant with case reports of foreign bodies in the rectum and colon and, as his series of cases reveals, there is almost no limitation to the type of foreign objects that could be encountered.

I am in total agreement with him when he states that most of these case reports merely indicate the presence of such an object and do not emphasize the fact that these foreign bodies by their mere existence are responsible for a large variety of serious complications or, what is even more likely, dangerous problems arising from their removal.

In regard to anorectal fistulas caused by foreign bodies I have found that in my last series of 150 cases of fistulas-in-ano two (1.3 per cent) were definitely associated with this condition. Inasmuch as this is not often noted in the literature, I would be interested to learn the experience of others.

The majority of foreign bodies are swallowed accidentally or intentionally. If a swallowed object passes the esophagus, pylorus and ileocecal valve, its most common point of arrest or blockage is the lower inch of the rectum or anus. Thus, a digital examination will usually make the diagnosis. However, proctosigmoidoscopic examination or x-ray may be necessary to locate objects higher up. Foreign bodies in the rectum or sigmoid should be removed at the earliest possible moment. Purgatives are, as a rule, banned. The exaggerated peristalsis they excite may force a sharp, pointed object into the tissue and invite trauma, laceration, and perforation.

At the proctologic clinics of the New England Medical Center and the Mount Auburn Hospital we have had a few similar experiences in regard to use of rectal thermometers. The entire personnel has been instructed in the cautious use of the thermometer.

Dr. ReBell's comment about the presence of peritonitis in conjunction with foreign bodies is most interesting to me inasmuch as in my proctologic practice I have not encountered similar cases. His experience teaches us that we must bear in mind the possibility of trauma in cases of peritonitis even when there may be no external evidence of such. Routinely, all patients that have had foreign bodies in the rectum or colon are placed on sulfathaladine therapy.

Although we frequently encounter sexual perversion in this type of case, Rosser in 1930 called attention to the fact that foreign objects are often employed by the patient to eleviate pre-existing pathologic conditions. Hence, we cannot be content with the removal of the object without correcting the associated pathologic condition. In 1944 Macht sited a long list of an unusual variety of foreign bodies gathered in his review of the literature as did Vaughn and Martin in 1946.

I would like to summarize three interesting cases of my series:

CASE I. Mr. J. C., a fifty year old Italian laborer, was seen as an acute, urgent problem because of sharp, agonizing pain in his rectum. During the previous evening he had ingested a meal consisting of large, flat macaroni. Digital examination revealed the presence of a flat piece of wood 10 by 1.2 cm., pointed at both ends, lying diagonally in the anus and rectum. Removal was easily accomplished with only slight hemorrhage. (Because the patient was placed on a liquid diet, his wife was about to serve him a very fine spaghetti in broth and in preparation noted the presence of a fine splinter of wood which was similar to that removed on the same day, thus saving the patient a possible second foreign body.)

CASE II. Mr. M. K., a twenty-six year old naval veteran, presented himself with constant tenesmus of five months' duration. Because of a combat neurosis, he was subjected to numerous studies among which a barium enema and a gastrointestinal series were included. Digital examination revealed the presence of a hard, ball-shaped, smooth mass, 7.5 cm. in diameter lying in the ampulla. He refused hospitalization and the mass was repeatedly chipped with a Kelly snap until it could be easily removed. Subsequent study revealed that the mass was composed of solid, inspissated barium. The resultant proctitis as well as the neurosis quickly subsided.

CASE III. Miss M. D., age thirty-five, came to the office complaining of sharp pain in the anal area of four days' duration; the pain was aggravated with bowel movements. Investigation revealed a pointed object protruding through the skin in the posterior commissure. This was removed with ease and a whole, blue toothpick was extracted. Upon questioning the only contact she had with a blue toothpick was at a formal tea that she attended two weeks before at which sandwiches were served, held together with red, white and blue toothpicks. Complications of a perianal abscess and a fistula-in-ano required surgery.

ALVIN BALDWIN (Dallas, Texas): Dr. ReBell has brought to our attention an interesting and informative subject that is seldom encountered in the literature, chiefly because the presence of a foreign body in the rectum or an injury therefrom is relatively uncommon. But when it does occur, this is a condition that demands immediate and definitive treatment.

The approach to any patient with a foreign body in the rectum should be to determine the location

of the foreign body and the possible route it may have traversed. Objective signs should be observed, such as presence of shock, abdominal tenderness, rigidity and perianal trauma, keeping in mind that the size of or the absence of a perianal wound has no bearing on the severity of the injury.

Any elevation of temperature or white blood count should be noted, these, however, to be used only as an aid in arriving at a decision as to how a case can be best managed.

Spinal anesthesia for relaxation of the sphincter muscles, with the aid of a variety of mechanical contrivances, permits in most instances recovery of the foreign body in a reasonable length of time.

The lithotomy or Sims position is no doubt preferable, due to the likelihood of loosing the object in the sigmoid colon when the patient is placed in the jack-knife position. Careful sigmoidoscopy should follow the extraction of any foreign body to determine the presence of a possible injury to the wall of the bowel.

There are three susceptible anatomic areas which are particularly important when injuries occur as a result of foreign bodies in the rectum: first, the abdominal viscera following the usual pattern of a ruptured viscus; second, the postrectal and pararectal spaces which may be subjected to a violent anaerobic infection when contaminated by a wound through the rectum and third, the posterior extraperitoneal space of the abdomen, through which a foreign body may pass into the postdiaphragmatic region and on into the chest. Injury to any one of these areas requires immediate surgery.

The method of management proved to be most satisfactory in the presence of an abdominal injury is to explore the abdominal region immediately, find any perforated viscus, repair it and do the preferred type of colostomy proximal to the perforation provided the injury is to the colon; or, if a perforation cannot be demonstrated, the presence of small particles of feces in the abdomen constitutes a justifiable reason for a colostomy in the upper sigmoid. The abdomen is then closed. The patient is placed in any suitable position to enter the postrectal space where drains are placed through which the space may be irrigated with antibiotics or oxidizing agents.

Parenteral medication consists of streptomycin, 5 Gm., every four hours intramuscularly for forty-eight hours, and large doses of penicillin for several days as well as other supportive therapy.

An important complication often associated with this type if injury is a psoas abscess, not uncommon when these injuries occur. It should be kept in mind when there is severe pain on extensive flexion, internal or external rotation of the thigh.

In caring for the colostomy the distal segment is not irrigated until about the eighth or tenth day. Since the bowel is defunctioned, there is no particular hurry to empty its contents. Irrigation of the proximal end may be started on the third or fourth day. The colostomy is then closed in the usual period of time one waits to close any temporary colostomy. This outline of treatment increases the morbidity and veers away from the spectacular, but it is safe.

Louis J. Hirschman (Detroit, Mich.): I should like to speak about some of the things that occur to children and I refer particularly to the crying baby who comes into a pediatrician's office and no cause is found for the child's distress.

So many of these babies, particularly those in the crawling stage, pick up various foreign bodies from the floor and swallow them and the first intimation that the child has done so is crying and discomfort and upon careful examination very often small foreign bodies in the anal canal will be found accountable for the child's discomfort.

I should like to mention some other foreign bodies. Most of the discussers have spoken about careful instructions to the nurses and orderlies in regard to insertion of a thermometer into the rectum. No matter how careful you are if you leave a thermometer for a moment, some patients, and often children, will investigate and with a little pressure the thermometer will disappear. An easy way to prevent this is to wrap an ordinary rubber band around the outer end of the thermometer. If there is a rubber band around the part that protrudes, you do not need to put a thermometer any further in the rectum than you would in the mouth—it cannot go further.

Concerning enema tubes sometimes I think we all should instruct every individual in every hospital where we operate never to use a hard metal, hard rubber or glass tip when giving enemas. Always have an ordinary urinary catheter slipped over the enema tip for all enemas and it will not produce trauma and is not so likely to escape, particularly if it remains attached to the tube and to the enema bag. If a nurse or mother knows a child has been playing with a pin or small object and swallowed it, usually the pediatrician gets a call. A simple, satisfactory way of helping deliver that foreign body not only unscathed but the patient uninjured is to have the patient swallow bits of absorbent cotton flavored with wintergreen, peppermint or the like. The cotton will follow the open safety pin or piece of glass down through the intestinal tract and the foreign body wrapped in cotton usually is evacuated with the stool.

Rudolph V. Gorsch (New York, N. Y.): One of the main difficulties in removing foreign bodies is the trauma incident to repeated manipulations with possible perforation of the gut followed by abscess formation and fistulization. The following may be of value in dislodging foreign bodies and avoid-

ing trauma: First, the coagulation current may be useful in shrinking or burning through wooden objects or fish bones lodged transversely in the bowel, second, a wire looped snare may fine easy adjustment around hard or metal objects such as a plastic shaving brush or a radiator valve and third, a biopsy scissors that has a toothed ratchet which fixes an object while it cuts may prove useful for foreign bodies impacted low in the rectum.

DR. REBELL (closing): I thank the discussers for their favorable comments and have only this additional note to make regarding thermometers which was mentioned by Dr. Hirschman. He referred to thermometers which were inserted into the rectum of infants by nurses who temporarily forgot them, only to return later to find that the thermometer had slipped into the rectal ampulla.

The three cases included in my report which were not presented disclosed broken thermometers lodged in the rectum; this was the result of unfamiliar anatomic knowledge of this region, combined with improper and forceful application of the thermometer. Therefore, I wish to re-emphasize the importance of caution whenever tips, thermometers or instruments are inserted into the rectum.

SACRAL AND PRESACRAL TUMORS

STUART T. ROSS, M.D.
Hempstead, New York

SACRAL and presacral tumors are not common but are of such importance when present that their diagnosis becomes a matter of primary concern to the proctologist. Since it is doubtful that a single observer ever has the opportunity to see a large number of these rare tumors, their diagnostic characteristics must be discovered by mass study of cases reported by numerous observers. For the same reason each case reported adds to our aggregate knowledge of the subject.

Incidence and Types. Whittaker and Pemberton[37] report an incidence of all kinds of presacral tumors of one in 40,000 general hospital admissions. In 440,255 admissions from 1939 to 1946 inclusive Kings County Hospital recorded seven cases of sacral tumors consisting of the following: one hypernephroma (from the left kidney); two osteogenic sarcomas; one endothelial myeloma; one osteoma; one osteochondroma and one chordoma. Meadowbrook Hospital in 67,769 admissions had two osteogenic sarcomas and two giant cell tumors of the sacrum. These figures represent a combined incidence of one in 46,183 general hospital admissions, which compares closely with the one in 40,000 of Whittaker and Pemberton.

TABLE 1

No		Sex		Age	Presacral Mass	Bone Destruction	Remarks
		M	F				
11	Teratoma and teratoids	5	6	All infants except 3	8	1 (malignant)	3 Malignant 1 with bone destruction and irradiation; death from malignancy
18	Chordoma	10	8	M—23–70 Av.—50.4 F—5–65 Av.—45.5	17 Post-sacral mass in one	All except 4	Recurrence in 9 Not noted in 5 None in 4 (3 mo., 1 yr., 5 yr., 9 yr.)
15	Dermoids	0	15	4 mo. to 67 yr. Av.—28.4	In all	None	Pain in 8 Sinus in 4 Partial incontinence 1
1	Appendiceal mass	1	0	4	Yes	No	
6	Ependymal cell gliomas	5	1	32–68 Av.—43.5	In all	In 3	Pain in all Cure in 2 only (3 yr. and 9 yr.)
4	Giant cell	0	4	19–57 Av.—34.7	In all	In all	Pain in all 2 deaths 1—no recurrence—9 mo. 1—no recurrence—10 yr.

Mabrey in 1935[25] collected from the literature 150 cases of chordoma which he analyzed. In 1944 Faust, Gilmore and Mudgett reported 102 more.[9] I have been able to find in the recent literature eighteen additional cases[2,6,9,10,12,19,25,27,30,37] to which should be added one case reported herein. In addition the literature of the past ten years contains reports of other tumors of the sacrococcygeal region as noted in Table 1. In each of these a presacral mass was present.

Age and Sex. Nearly all teratomas are found in infancy and occur in about equal numbers in males and females. Chordomas are

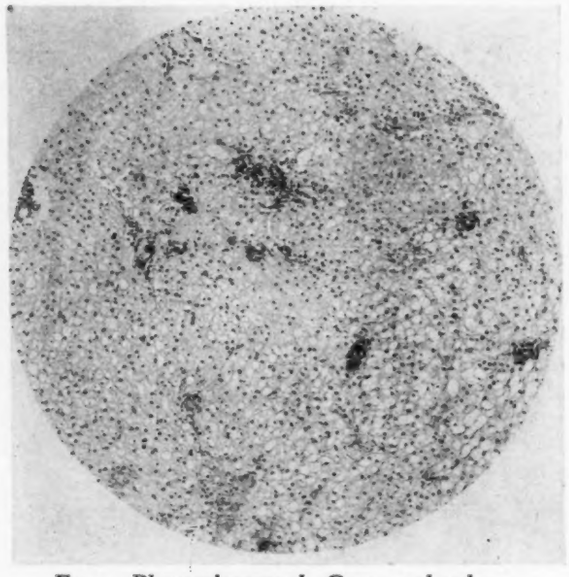


FIG. 1. Photomicrograph, Case 11; chordoma.

found more frequently in males. The average age in this series was 50.4 years in males and 45.5 years in females. Dermoids are discovered most often in young women in their twenties. I have been unable to find a single report of a presacral dermoid in the male. Although a preponderance so overwhelming must have a definite reason, no convincing explanation for the phenomenon is known.

Etiology. No attempt will be made here to describe or list all of the many theories of origin of sacral and presacral tumors. Although the subject is controversial, it is generally accepted that chordomas are derived from notochordal remnants and that teratomas in some instances at least may represent parasitic twins. Dermoids are undoubtedly the result of faulty embryonic development although it is impossible to determine with certainty whether or not they are derived from the tissues of the proctodeum as some assert.

Pathology. A true dermoid is an encapsulated ectodermal cyst lined with stratified squamous epithelium. Sebaceous glands and hair may or may not be present, but the cyst is usually filled with sebaceous material.

As the name teratoma implies the tissues found in a teratoma are derived from all three germ layers and not from ectoderm alone. When the tissue structures are well organized and actual portions of organs can be identified, these tumors are frequently designated teratoids. Neither dermoids nor teratomas are invasive tumors *per se* but the latter frequently become malignant.

Although a chordoma may be encapsulated when early, it is locally invasive and characteristically invades the sacrum. The tumor is soft and may be sufficiently elastic to simulate a cyst. Upon section it is gray, trabeculated and rather gelatinous. Microscopically the tumor consists of pale cells with almost no stroma, sometimes appearing to grow in cords and having a foamy appearance. (Fig. 1.)

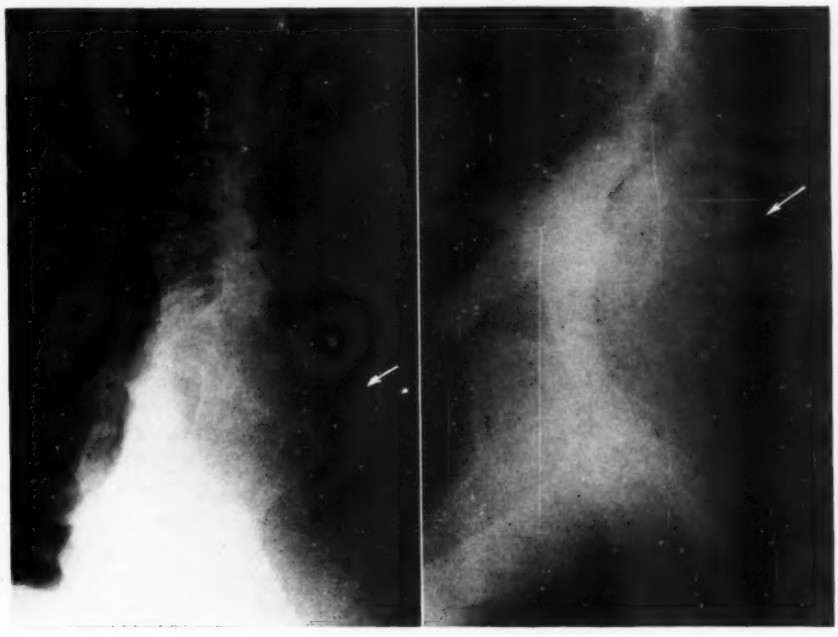
TABLE II
SACROCOCCYGEAL CHORDOMAS

		Analysis of 150 Cases Previous to 1935		Analysis of 16 Cases Since 1935	
Average age	Male	50.3		44.6	
	Female	43.2		45.8	
Sex	Male	58		10	
	Female	27		6	
		No.	Per cent	No.	Per cent
Symptoms					
Pain		37	24.6		
Pain and tumor		22	14.6	14	87.5
Tumor		15	10.0	2	12.5
Constipation		5	3.3	4	25.0
Pressure		4	2.0	2	12.5
Blood		2	1.3		
Urinary disturbance		3	2.0		
Swelling of thigh		1	0.6		
Ulcer		1	0.6		
Numbness		..	....	2	12.5
Incontinence		..	....	4	25.0

The various malignant tumors which arise in or metastasize to the sacrum do not differ essentially in their pathology from the same tumors encountered elsewhere.

Symptoms and Differential Diagnosis. Ordinarily a teratoma will be discovered at or soon after birth. When intrapelvic, the symptoms are those produced by pressure and usually take the form of interference with micturition or defecation. Final diagnosis is made by the pathologist following excision.

Dermoids, on the other hand, are usually found in young women. They produce pressure symptoms and are sometimes asymptomatic. However, the cyst may become infected and



2 3

FIG. 2. Lateral x-ray showing vertebral column and upper part of sacrum; remainder of sacrum demineralized and destroyed as indicated by arrow.
FIG. 3. Lateral view; rectum outlined by barium is narrowed and displaced anteriorly by tumor. Arrow indicates area of destruction of sacrum.

consequently painful. If a dermoid becomes abscessed and ruptures externally, the patient may present a persistent blind sinus extending from the post-anal skin to the presacral space.

Predominant symptoms of chordoma are pain, constipation, a feeling of pressure, numbness or paresthesias and varying degrees of incontinence. A presacral mass and roentgenologic evidence of bone destruction are almost invariably present. In Table II a comparison is made between Mabrey's 150 cases[25] and the sixteen cases collected from recent literature.*

In Table II the figures are roughly in agreement with the following exceptions: Pain and tumor were more constant factors than in the cases collected by Mabrey; constipation and a feeling of pressure were much more frequent; and complaints of numbness and incontinence are added to the list.

Prognosis. Dermoids rarely become malignant and can usually be extirpated without undue difficulty. Prognosis is, therefore, excellent. A good outlook for patients with teratoma may be predicted only if the growth can be successfully and completely extirpated. Many infants with teratoma do not survive the ordeal of birth and some have additional congenital malformations which affect their health. Moreover many teratomas tend to become malignant. Prognosis for the various malignant tumors is, of course, poor. A chordoma is locally malignant and has a marked tendency to recur. Although cases of metastasis from chordoma have been reported, these are uncommon. The author knows of no case of complete recovery.

Treatment. The treatment for all cases of presacral tumors is surgical excision whenever possible. Dermoids can usually be removed successfully and no further care is needed. Chordomas and sarcomas usually cannot be completely excised. For malignant tumors including chordoma operation should be followed by radiotherapy in each case.

* Actually, eighteen cases have been reported but two are omitted from this analysis because their ages (three months and five years) and the lack of bone destruction are so unusual that they throw off the statistical averages to a disproportionate degree. It is realized that this arbitrary exclusion may appear unjustifiable to some. Full details of these two cases were given by Whittaker and Pemberton.[37]

CASE REPORTS

CASE 1.* F. G., a white female of fifty-seven, was admitted to Mercy Hospital on July 13, 1947,

* I am indebted to Dr. H. E. Conly and Dr. William G. Burke for permission to report this case.

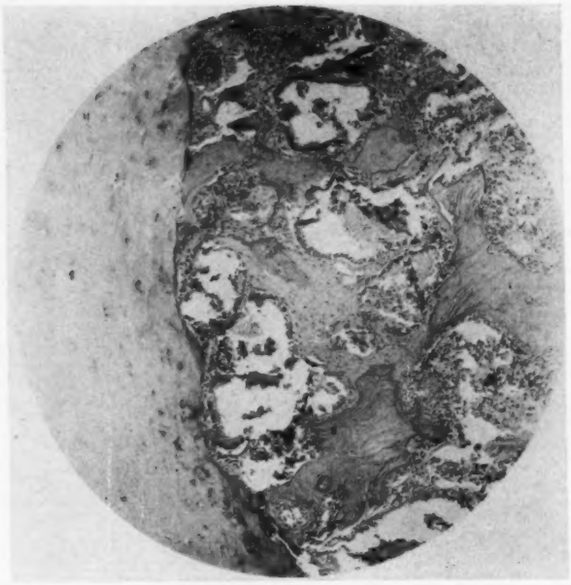


FIG. 4. Photomicrograph of sacrum from Case 1. Area at left is bony sacrum; at right is infiltrating adenocarcinoma.

complaining of an acute onset of abdominal pain and backache two weeks previously. These symptoms had continued and had been followed by progressive loss of control of the urinary bladder and anal sphincters and then by constipation which alternated with diarrhea.

The patient had had a uterine suspension performed in 1921. Her menstruation had ceased three and one-half years before admission and hot flashes had been noted during the past year. Eight months prior to admission she began to lose her memory and her interest in life and became emotionally unstable.

Physical examination was essentially negative except for a presacral mass approximately 10 by 7 cm. in size fixed to the pelvic wall and the right side of the anterior surface of the sacrum. The tumor was extrarectal, firm, elastic and slightly irregular. An attempt to perform a barium enema was unsuccessful because of the patient's inability to retain the barium. An x-ray of the sacrum did not reveal any definite bony destruction. Urinalysis and a complete blood count were normal. The blood urea nitrogen was 23 mg. per 100 cc.

At operation, the coccyx and lowest inch of the right side of the sacrum were removed. The major portion of the tumor was excised and the cavity packed. It was not possible to remove the entire mass. The pathologic diagnosis was chordoma. (Fig. 1.) This patient is receiving x-ray therapy.

CASE II. L. H., a sixty-four year old white female, was admitted to Meadowbrook Hospital on January 12, 1947. Six years prior to admission the patient had had a panhysterectomy for cancer of the fundus uteri. Following this she was apparently well for five years until she developed a pain in her lower back while shovelling. She returned to the hospital where her hysterectomy had been performed and received ten deep x-ray treatments following which she felt perfectly well until the time of the present illness. Three days before admission for no evident reason the patient developed a sudden severe pain in her lower back and was hospitalized.

Physical examination at that time revealed a fairly well nourished, adult, white female in moderate pain. She complained of pain in the neck as well as in the lower back and refused to flex the neck but would move the head slightly from side to side. Examination of the eyes, ears, nose, throat and lungs was negative. The heart was normal except for a slight systolic murmur at the apex. There was a moderate degree of incontinence of both urine and feces and slight paresthesias in the left lower extremity. I found a relaxed external sphincter, a fecal impaction which was removed without difficulty and a retrorectal mass. This mass was about the size of a half grapefruit, firm, tense and cystic. It did not invade the rectal mucosa and was fixed to the sacrum. Pelvic examination elicited no further information. The mass was aspirated through a No. 20 gauge 4 inch needle introduced just to the right of the lower end of the sacrum and 50 cc. of bloody, cloudy fluid were withdrawn. The fluid contained débris and a few leukocytes. Culture was sterile.

Neurologic examination revealed diminished sensitivity to pain and touch from the left foot to the left calf and to some degree in the perineum. Both legs were paretic, the left being worse than the right. The deep tendon reflexes were diminished. The neurologist reported that the "findings would indicate lesion of sacral segment of the cord."

X-rays revealed destruction of the third and fourth sacral segments. The roentgenologist noted that "there is so much demineralization, however, that it is difficult to delimit the extent of the destruction." (Fig. 2.) A barium enema showed the rectum to be narrow and displaced anteriorly. (Fig. 3.) Roentgenograms of the chest, head and of the cervical, thoracic and lumbar spine were essentially negative.

The patient steadfastly refused any treatment except analgesics and expired two months following admission.

Autopsy was limited to the mass which was found to be a presacral and pelvic adenocarcinoma with abscess formation and direct extension into the sacrum. (Fig. 4.) The small intestine, sigmoid and bladder were all bound down in the pelvis and there were numerous pockets of grayish pus. The sigmoid and the part of the rectum removed revealed no invading tumor tissue.

COMMENT

Although instances of metastatic carcinoma invading the sacrum exist, I have been unable to find one which so closely simulated chordoma. One hospital has had no cases in over 100,000 admissions since 1932. A search of the records of another hospital with an active tumor service reveals that since the hospital was opened (67,769 admissions) there have been four cases of carcinoma of the sacrum, an incidence of one in 16,942 admissions. These cases are tabulated in Table III.

TABLE III

Patient and No.	Sex	Age	Primary Source	Means of Diagnosis	Rectal
LD-43973	F	51	Breast	Clinical impression: diagnosis doubtful	No mass; no symptoms
BG-8504	M	62	Prostate	Autopsy	Tender enlarged prostate; no sacral or retrorectal mass
FK-11170	M	74	Prostate	X-ray—mottling suggestive of metastasis	Tender prostate; no retrorectal mass
SS-21905	F	61	Cervix	X-ray—"diffuse pressure atrophy"	Rectal examination not performed

It will be seen at once that the diagnosis was extremely doubtful in the first and fourth cases and that no presacral mass was present in the other two. In not a single one of these cases could the diagnosis reasonably be confused with chordoma.

SUMMARY AND CONCLUSIONS

1. Sacral and presacral tumors are discussed and their rarity emphasized.

2. Analysis of eighty-one cases from recent literature plus eleven additional cases brings out the following conclusions: (1) Practically all teratomas are found in young children and are about equally divided between the sexes. (2) Dermoids occur at all ages, but the presacral dermoid in this collection of cases is limited to the female sex. (3) Bone destruction in sacral tumors is apparently limited to cases of chordoma, sarcoma and metastatic carcinoma. (4) The most common presacral tumor producing pain and bone destruction is chordoma. (5) At present there is no satisfactory treatment for chordoma. The best treatment seems to be excision whenever possible, followed by irradiation.

3. Two cases are reported, one of sacrococcygeal chordoma and one of metastatic carcinoma of the sacrum.

REFERENCES

1. Brav, E. A. et al. Endotheliomyeloma (Ewing's tumor) of the sacrum. *J. Bone & Joint Surg.*, 20: 1034, 1938.
2. Brindley, George V. Sacral and presacral tumors. *Ann. Surg.*, 121: 721, 1945.
3. Camp, John D. et al. The roentgenologic diagnosis of tumors involving the sacrum. *Radiology*, 31: 398, 1938.
4. Carney, Henry M. Presacral dermoid. *Ann. Surg.*, 119: 155, 1944.
5. Chaffin, Lawrence. Clinical aspects of sacrococcygeal teratomas. *Surg., Gynec. & Obst.*, 69: 337, 1939.
6. Coley, Bradley L. Sacral chordoma—one year after radical excision. *Ann. Surg.*, 105: 463, 1937.
7. de Veer, J. Arnold and Browder, Jefferson. Sacrococcygeal teratoma. *Ann. Surg.*, 105: 408, 1937.
8. Ewell, George H. and Jackson, Russell. Infected presacral dermoid cyst with perforation of the vagina. *Southb. Surgeon*, 11: 855, 1942.
9. Faust, Daniel B. et al. Chordomata: a review of the literature, with report of a sacrococcygeal case. *Ann. Int. Med.*, 21: 678, 1944.
10. Gabriel, W. B. Sacro-coccygeal chordoma. *Proc. Roy. Soc. Med.*, 29: 1007, 1936.
11. Gius, John A. and Stout, Arthur Purdy. Perianal cysts of vestigial origin. *Arch. Surg.*, 37: 268, 1938.
12. Graf, Lotte. Sacrococcygeal chordoma with metastasis. *Arch. Path.*, 37: 136, 1944.
13. Gray, Jessie. Successful removal of a sacral parasitic fetus. *Canad. M. A. J.*, 47: 520, 1942.
14. Hepler, Alexander B. Presacral sympathicoblastoma in an infant causing urinary obstruction. *J. Urol.*, 49: 777, 1943.
15. Howze, Charles P. and Jaeger, Dorothy S. Retention of urine in children due to extravesical pelvic disease: report of two cases. *J. Urol.*, 52: 319, 1944.
16. Huene, Nevin. Trigerminal teratoma of the sacrum. *J. Michigan M. Soc.*, 41: 1056, 1942.
17. Hundling, Herman W. Ventral tumors of the sacrum. *Surg., Gynec. & Obst.*, 38: 518, 1924.
18. Jones, J. Bolling. Sacrococcygeal cysts. *Southb. Med. & Surg.*, 98: 411, 1936.
19. Keane, William E. Chordoma: report of a case. *J. Michigan M. Soc.*, 43: 232–233, 1944.

20. Lisco, Hermann. Malignant tumors developing in sacrococcygeal teratomata. *Ann. Surg.*, 115: 378, 1942.
21. Loe, Ralph H. Sacrococcygeal tumors. *West. J. Surg.*, 50: 202, 1942.
22. Lorenz, Howard. Anococcygeal cyst. *Am. J. Dis. Child.*, 62: 130, 1941.
23. Love, J. Grafton and Moersch, Frederick P. Sacrococcygeal teratoma in the adult. *Arch. Surg.*, 37: 949, 1938.
24. Lowe, George H., Jr., Dixon, Claude F. and Piper, Monte C. Perforating ovarian cystic teratomas: report of an unusual case. *Proc. Staff Meet. Mayo Clin.*, 22: 117, 1947.
25. Mabrey, Roy E. Chordoma: a study of 150 cases. *Am. J. Cancer*, 25: 501, 1935.
26. Manheim, Sylvan D. Presacral dermoid cyst. *J. Mt. Sinai Hosp.*, 6: 31, 1939.
27. Mixter, Charles G. and Mixter, William Jason. Surgical management of sacrococcygeal and vertebral chordoma. *Arch. Surg.*, 41: 408, 1940.
28. Neal, M. Pinson and Carlisle, John B. Congenital sacro-coccygeal tumors. South. M. J. 36: 677, 1943.
29. O'Leary, Charles M. et al. Retroperitoneal teratoma. *Surgery*, 21: 194, 1947.
30. Olsman, Louis et al. Sacrococcygeal chordoma. *Am. J. Surg.*, 60: 115, 1943.
31. Oxer, G. M. A proctological problem. *M. J. Australia*, 1: 483, 1940.
32. Pack, George T. and Braund, Ralph. Sacrococcygeal teratoid tumor. *Ann. Surg.*, 116: 76, 1942.
33. Pearse, Herman E. Removal of ventral tumors of the sacrum by the posterior route. *Surg., Gynec. & Obst.*, 33: 164, 1921.
34. Pulskamp, M. H., Griswold, R. A. and Blair, F. L. Secondary intrarectal solid teratoma of the ovary. *South. Surgeon*, 10: 880, 1941.
35. Saphir, Joseph F. True dermoid cyst of the anterior wall of the rectum. *M. Rec.*, 149: 111, 1939.
36. Sloat, J. I. et al. Ewing's tumor of the sacrum. *J. A. M. A.*, 119: 1499, 1942.
37. Whittaker, Lorin D. and Pemberton, John deJ. Tumors ventral to the sacrum. *Ann. Surg.*, 107: 96, 1938.
38. Yeomans, Frank C. Some practical considerations in proctology. *New York State J. Med.*, 34: 138–142, 1934.
39. Yeomans, Frank C. Perianal cysts, with report of case of multilocular inclusion cyst of perineum. *Tr. Am. Proct. Soc.* 41: 151, 1940.
40. Yeomans, Frank C. Granulomata of rectum, specific and non-specific. *Tr. Am. Proct. Soc.*, 43: 200, 1942.

DISCUSSION

Richard H. Appel (Indianapolis, Ind.): Dr. Ross has adequately discussed the subject on which he engaged. There are, of course, many other types of tumors which we run into occasionally. At the present time we have one among our cases, a patient operated upon for adenosarcoma just anterior to the sacrum approached from the abdomen. Subsequently he developed a fistulous or sinus tract and then it became our baby.

These cases are very likely to fall into our hands. There is still a third type of tumor we frequently encounter from the vesication of sinus or fistulous tracts. We have a recent example of that, namely, a fistula of several years' standing. When investigated, it was found to lead to a large carcinoma which had not been diagnosed in advance, just anterior to the sacrum. I think that is frequently true of this type of disorder. We begin with the assumption that every case we see is diagnosed before surgery. That is not true. These tumors and these conditions, I think, are more primarily ours than any other of the surgical conditions of the rectum.

James P. Fleming (Rochester, N. Y.): I suppose when we think of the sacral and presacral tumors, most of our attention is focused on the dreadful chordoma, a tumor not so rare as heretofore believed. Although reported of low grade malignancy, it is not curable. I wonder if anyone has heard of or knows of a cured case of "chordoma." I know of several cases with seven-year arrests but I know of no complete cure as ever having been reported.

In making a correct diagnosis of the ventral sacral tumors, one must be most cautious as many have proved to be connected with the meninges, the so called "meningocele sacralis anterior." In several instances the tumor has been unmistakenly drained of clear fluid and death has followed soon thereafter. These growths, therefore, occur as surgical surprises more often than not. They may attain large dimensions, extending upward behind the pelvic peritoneum, causing intrapelvic pressure symptoms. In cases in which spina bifida is associated, all your diagnostic resources may be taxed in making a differential diagnosis. It is sometimes difficult to decide clinically between a spina bifida sac, meningocele, myelocele and dermoid. Differentiation must also be made between presacral tumors and fibroids, intraligamentous cysts, ischiorectal abscess, congenital dorsosacral hernia containing bowel and bladder, lymphangiomas, angiosarcomas and lipomas.

I might add in conclusion that the x-ray is a most important diagnostic aid in clearing up the diagnosis of spina bifida. I wish also to stress the necessity of early definitive diagnosis in sacrococcygeal teratomas as there is a definite risk of early malignant change. Lisco has described two cases in infants aged ten and 13 months, respectively, who developed a papillary adenocarcinoma with widespread metastasis. From a review of the literature I have found ten similar cases which seem to indicate the necessity for early treatment in this type of case.

George H. Ewell (Madison, Wis.): As Dr. Ross has pointed out, tumors and cysts of the sacro-

coccygeal region are relatively rare. The complexity of their composition has given rise to much confusion as regards their classification, mechanism of origin and the symptomatology which they may present. The explanation for the great complexity of structures lies in the fundamental embryology of the region and this same reason accounts for the vague symptomatology and the sometimes bizarre way in which these tumors or cysts present themselves.

In one case of an infected presacral dermoid cyst in a woman on whom I operated, the cyst had perforated the vaginal wall at the introitus in such a way that the case had been erroneously diagnosed as a fistula-in-ano and on this assumption had been operated upon twice. In this instance very adequate exposure of the presacral area was obtained by using a Voelker incision with removal of the coccyx and the last segment of the sacrum; the removal of the sacral segment may or may not be necessary.

As proctologists, we should also bear in mind another type of dermoid cyst, namely, cystic teratoma of the ovary which may in rare instances perforate or communicate with the intestinal tract.

ORGANIZATION AND OPERATION OF A DEPARTMENT OF PROCTOLOGY IN A U.S. VETERANS HOSPITAL*

SOME EXPERIENCES GAINED FROM THE FIRST YEAR'S OPERATION

WILLIAM C. BERNSTEIN, M.D.
St. Paul, Minnesota

WITH the reorganization of policy for the care of veterans after World War II whereby Veterans Hospitals situated in the vicinity of medical schools were able to become affiliated with teaching institutions, the Veterans Hospital at Minneapolis, Minnesota, was one of the first to establish an intimate liaison between the active staff of the hospital and the University of Minnesota Medical School. At the present time a large number of physicians, most of whom are veterans of World War II, are taking residencies in medicine, surgery and the allied specialties and are receiving the benefits of the clinical material at the Veterans Hospital and of the teaching facilities of the University of Minnesota. Through the active interest and support of Dr. H. S. Diehl, dean of the medical school, Dr. O. H. Wangensteen, professor of surgery, Dr. W. A. Fansler, chief of proctology and Dr. J. R. Paine, chief of the department of surgery at the Veterans Hospital† a proctology service was organized and has been functioning since January 1, 1947.

The need for such a service under the supervision of trained proctologists became apparent when it was noted that many patients remained in hospital beds for relatively long periods of time for seemingly simple anorectal disorders and that there was an ever increasing waiting list of patients in need of proctologic services.

The proctology service functions as an integral part of the department of surgery. Sixteen beds were first alloted to the service and subsequently four additional beds were added. A physician who is a resident in general surgery is assigned to the proctology service for a period of three months. The resident works under the direction of the consultant in proctology who conducts diagnostic and surgical clinics and who personally examines each patient on regular ward rounds. The resident also performs a large number of the surgical operations after having assisted the consultant on similar cases. The proctology resident is personally responsible for all histories, physical examinations and for the preoperative and postoperative care of his patients. Considering the number of patients in his wards and the relatively rapid turnover of his patients, the service has proven to be a very rugged one for the proctology resident. Each resident has, however, felt well compensated for his efforts by having gained a tremendous amount of experience in handling a type of patient that ordinarily would have received little special attention.

All types of anorectal disorders have been seen at this clinic during the past year and the four residents who have rotated through the service have had an intensive and thorough course in the basic principles underlying the diagnosis and treatment of anorectal diseases. Time has been taken regularly for chalk talks and discussion periods. Seminars in the hospital have included proctologic subjects and residents have been encouraged to familiarize themselves with the literature in this field. Several residents have written comprehensive papers on proctologic subjects while working on the service.

Approximately 1,100 complete proctoscopies and sigmoidoscopies were performed in the clinic during the twelve-month period under discussion. Due to the crowding of the existing facilities in the proctology clinic and because of the desire to permit residents on the medical service to gain experience in proctosigmoidoscopy, the medical service at the hospital has conducted its own examinations and has

† Now Professor of Surgery, University of Buffalo, Buffalo, N. Y.

* Published with permission of the Chief Medical Director, Department of Medicine and Surgery, Veterans Administration, who assumes no responsibility for the opinions expressed or conclusions drawn by the author.

referred only those patients to the proctology clinic in whom difficulty has been encountered in examination or diagnosis.

During the year 1947 there were 499 anorectal operations performed. (Table I.)

TABLE I

Hemorrhoidectomy	237
Treatment of pilonidal disease	111
Treatment of fistula-in-ano	50
Treatment of perirectal abscess	23
Treatment of fissure-in-ano	25
Miscellaneous	53
	499

Posterior anotomy for stenosis
Surgery for pruritus ani
Excision of condylomata accuminata
Fulguration of rectal and sigmoidal polyps
Excision of hypertrophied anal papillae
Sphincterplasty for anal incontinence
Surgical treatment of rectal prolapse

Most of the patients admitted on the proctology service have been young men who are veterans of World War II. A small number of patients are veterans of World War I and a still smaller number saw service in earlier wars.

TABLE II

OPERATIONS PERFORMED IN 1946 AND 1947

	Hemorrhoids	Fistula	Abscess	Fissure	Pilonidal Disease	Misc.	Total
1946	121	20	10	11	60	7	222(p)
1947	237	50	23	25	111	53	499

While quite a large number of the patients were treated for recurrences of trouble for which they had been operated upon during the war, it is quite apparent that the number of recurrences seen is a very small percentage of the enormous number of patients who were operated upon during the war years. The largest number of recurrences were seen in patients with pilonidal disease. Recurrent hemorrhoids made up the second largest group. The fact that a larger number of recurrences has not been seen bears testimony to the excellent grade of work performed by our surgical colleagues in the armed forces during World War II.

HEMORRHOIDS

The treatment of hemorrhoids at the Veterans Hospital in Minneapolis has been entirely surgical; 237 hemorrhoidectomies were performed in 1947. The technic for anatomic dissection as described by Fansler was used routinely with uniformly satisfactory results. We have had only four complications worthy of consideration in this paper. One patient developed a perirectal abscess three weeks following his operation; one patient had a large subcutaneous hematoma which required evacuation of the clot; another patient developed a postoperative anal stenosis which required a secondary surgical procedure for correction; the fourth patient had a postoperative hemorrhage which was severe enough to require a transfusion but in whom no actively bleeding vessels could be found when the operative area was explored. The average hospital stay following hemorrhoidectomy was five to seven days for patients living in St. Paul or Minneapolis and about ten days for patients living outside this area. Very few patients have required hypodermic medication after the day of operation and all patients have been ambulatory after the first postoperative day. Postoperative dressings have been done on all patients for approximately four weeks either by the resident in proctology or by the home physician.

PERIRECTAL ABSCESSES AND FISTULAS

All acute perirectal and perianal abscesses in this clinic were treated by the uncapping or scalping operation in which an attempt is made to create a skin wound as large as the abscess cavity itself. An attempt is also made to bring the edge of the skin wound as close to the sphincter muscle as possible in order to decrease the length of the resultant fistula. No complications were encountered in the treatment of perirectal abscesses. All abscesses were operated upon as soon as the diagnosis was made. The thesis has been accepted by us that the sooner the abscess is opened, even though a considerable amount of normal tissue is sacrificed in reaching the abscess, the less will be the

damage to the anal musculature and supporting structures. In some cases of perirectal abscess it was possible to identify and remove the primary fistula tract at the time of the abscess operation. This procedure is done (1) when the tract and primary opening can be easily identified and (2) when the tract lies quite superficially so that a relatively small amount of sphincter muscle fibers need be incised.

Twenty-three perirectal abscesses were treated during 1947. During this same period there were fifty perirectal and perianal fistulas operated upon. These fistulas varied from those with a single and simple tract to those with many openings, branching tracts and deep ramifications. It has not been necessary to establish a preliminary colostomy for diversion of the fecal stream in any of these patients but it is believed that such a procedure should be carried out when the fistulectomy is to be of such magnitude that healing will be definitely retarded by the fecal stream and when a long period of anal incontinence is anticipated. No particular difficulty has been encountered in obtaining healing in any of these patients and no patients have been rendered incontinent by fistulectomy.

FISSURE-IN-ANO

The incidence of anal fissure in proctologic practice is higher than the figures presented here would indicate. Twenty-five patients were operated upon for anal fissure in whom the fissure was the major finding. Hemorrhoids of lesser or greater degree were removed in many of these patients while anal fissures which were co-existent in many of the patients listed under hemorrhoids were also removed. It is our belief that the proper treatment for fissure-in-ano in a clinic such as we conduct should be entirely surgical. While having a definite place in private practice, non-surgical or palliative methods in a veterans hospital would increase the load on already crowded facilities by deferring the time of surgery and by making subsequent hospital admissions necessary. The operation as performed on this service consists of (1) excision of the fissure together with associated anal skin tags and hypertrophied anal papillae, (2) elimination of associated infected anal crypts and (3) creation of a large racket-shaped wound which can be easily kept open until proper healing has taken place. These wounds require meticulous postoperative care to avoid secondary stenosis due to scarring. No cases of fissure-in-ano were seen which were thought to be due to tuberculosis, syphilis, agranulocytosis or Vincent's infection.

POLYPS OF THE RECTUM AND COLON

One of the most important functions of the proctologic service is the identification of either malignant or premalignant polyps in the rectum and colon. It is our belief that cancer of the rectum and colon is best treated by preventing its development. We have adopted the belief that every patient examined on the proctologic service has potential cancer of the bowel and a thorough search is made for it. Only in this way and through the adoption of this attitude can most early lesions be discovered. We have come to be very polyp conscious and our efforts have been rewarded by frequently picking up unsuspected cases of polyposis of the rectum and colon. All benign polyps which were found in the rectum and lower sigmoid colon were destroyed by fulguration while those in the upper portions of the colon were treated by resection of the polyp-bearing portion of the colon.

In many patients with multiple polyposis of the rectum and colon in whom a complete colectomy is being considered, the decision to preserve the rectum and to destroy the polyps in this segment of bowel must rest with the proctologist. In this series of cases several young men are represented who have had ileosigmoidostomies for multiple polyposis and in whom fulguration has been carried out. These patients will have to be checked several times a year for several years and at yearly intervals for some time thereafter but the avoidance of an ileostomy or colostomy is ample reward for any inconvenience attending follow-up admissions.

TUBERCULOSIS

The Veterans Hospital at Minneapolis has a tuberculosis service which cares for approximately 200 patients. The proctology service has seen the tuberculous patients with rectal complications and has operated upon those who had abscesses, fissures and fistulas and who have complained of symptoms. In this group healing may have been delayed somewhat when compared with non-tuberculous

patients but satisfactory results have been obtained in all cases.

One tuberculous patient was operated upon for a large perirectal abscess. When the cavity was uncovered, it was found to be filled entirely with products of caseation necrosis which resembled cottage cheese. No free pus was found. This condition is a very unusual one and is the first of this type to be encountered by us. Healing of the cavity progressed rapidly and completely.

TABLE III

AGE OF PATIENTS OPERATED UPON FOR PILONIDAL DISEASE

Years	No. Patients
20 to 30	91
30 to 40	6
50 to 55	3
	100

PRURITUS ANI

The experience of the proctology service during 1947 has been rather unique in that relatively few veterans have applied for treatment for pruritus ani. This is in marked contrast to the experience in private practice in which approximately 25 per cent of all patients give itching as one of their chief complaints.

A considerable number of hospital patients on other services have been seen in consultation because of a complaint of pruritus ani. The policy of beginning the treatment in each case with a mild and simple therapeutic procedure and progressing to the more radical types of treatment has been followed. It has been possible in most cases to afford relief without radical therapy. Three patients were operated upon for pruritus ani using the modified Ball procedure after removing all hemorrhoids and abnormal anal crypts. The alcohol injection method as described by Buie was used in one patient. These four patients have all been benefited considerably by these procedures.

It is with no regrets that the statement is made that pruritus ani has not been one of the major problems encountered on this particular service.

PILONIDAL DISEASE

One hundred eleven patients suffering with pilonidal disease were treated surgically on the proctology service during 1947. A statistical survey of one hundred consecutive cases in this series reveals that ninety-one patients were between twenty and thirty years of age; six were between thirty and forty and three were between fifty and fifty-five. Eighty-two patients had had spontaneous drainage of their first abscess; twenty-four of these required additional surgical drainage. Nine patients had had surgical drainage only and nine had had no previous drainage at the time of curative surgery. In this series of one hundred patients seventy-four had had no previous attempts at curative surgery. In other words previous operations consisted only of incision and drainage of abscesses. Twenty-six patients had had previous attempts at curative surgery and on these patients a total of thirty-one surgical operations had been performed. In this group of thirty-one operations fifteen had been some type of open operation and sixteen some type of closed procedure.

TABLE IV

DRAINAGE PRIOR TO CURATIVE SURGERY

Spontaneous drainage	58	
Spontaneous plus surgical drainage	24	82
Surgical drainage only	9	
No previous drainage	9	
	100	

The modified closure method which was first described by Colp and later elaborated upon by DePrizio and others was employed in the majority of cases. This method was also advocated by Rosser in his paper on pilonidal disease which was read before the Section on Proctology and Gastroenterology of the American Medical Association in San Francisco in 1946. In each case of radical excision of the pilonidal cyst or sinus preservation of the sacrococcygeal fascia which carries the nutrient vessels to this area has been carried out. A few patients were treated by the marsupialization method of Buie. No primary closures were done in this series. Although it is too early to evaluate the final results in this group of patients, it is believed that our results to date have been very satisfactory. One patient has already been re-operated upon for recurrence. In four or five others secondary surgical procedures have been carried out to aid healing. The necessity for secondary procedures is due to poor mechanics of the healing wound rather than to infection or recurrence. We believe that more meticulous postoperative care would

have prevented delayed healing in some cases. With the exception of several extremely large and complicated cases all patients were able to leave the hospital in one to three weeks following surgical operation. A very active out-patient dressing program was carried out for all of these patients and most of them returned to their occupations soon after leaving the hospital. No difficulty has been encountered with painful postoperative scars regardless of the extent of the process and as far as it is known all patients have been able to return to their usual occupations or activities.

In view of our findings as far as recurrences are concerned it is our belief that many more cases of pilonidal disease should be amenable to a closed operation than we have been willing to concede in the past. For this reason we have reviewed the literature on the different types of closed operative procedures and find that patients who have a closed operation are usually kept on their abdomen for ten or twelve days and are given special diets to minimize bowel activity. This routine would place greatly increased demands on our nursing and dietary staffs which are already overburdened. Our pilonidal patients require a minimum of nursing care after the day of surgery and are able to help with ward work during most of their hospital stay. A full general diet is given after the day of surgery so that no special help is needed in this respect. We, therefore, will continue to use the modified closure method until general conditions permit us to adopt a procedure which requires more nursing and dietary care.

RECURRENT PILONIDAL DISEASE

Twenty-eight patients had had previous curative procedures. Thirty-one operations had been performed: fifteen by means of the open method and sixteen by the closed method. Twenty of these operations had been performed in the Armed Services and eleven in civilian practice.

CONCLUSION

The Veterans Hospital at Minneapolis is one of a large number of similar institutions situated close enough to medical teaching centers to carry on extensive teaching programs. The proctology service in every Veterans Hospital can be made a very active one. Since estimates from official sources indicate that the Veterans Administration Facilities will not be carrying their peak load until about 1980 it is obvious that Veterans Hospitals will be a very rich source of clinical material for many years to come. It would be very wise to take advantage of this source of teaching material for residencies and fellowships in proctology. In hospitals where proctology services are organized and training programs are conducted the patient is the recipient of better proctologic care and the resident is the recipient of invaluable training and experience.

DISCUSSION

LOUIS E. MOON (Omaha, Neb.): I am in full accord with all of the plans that Dr. Bernstein has outlined for the management of his service as well as for the operative procedures and the care of his patients. The care as outlined should be adequate. What I want to talk to you about particularly is the opportunity that these hospitals present to teach proctology.

Dr. Bernstein today has presented concrete evidence that the facilities for teaching proctology are present in his hospital and in many other areas throughout the states. The need of a proctologic service in every surgical hospital is well known to each of you who do this type of work. The doctor has called your attention to the increasing waiting lists for proctologic service in these veterans' hospitals.

In my community I am taking care of many patients who could go to the veterans' hospital but do not. If you ask them why they do not go, they will give you three good reasons:

First, they must wait several weeks to get in. Inasmuch as rectal surgery is usually elective surgery, they are not called until the surgical department runs out of something to do. The patients cannot make any definite plans as to when they can leave their job or as to how long they will have to be away from work. Second, the patient will have to stay in the hospital from ten days to six weeks. Economically he can stay at home and pay his way and be ahead. Third, he wants to know that his operation is going to be done by someone who has had training in proctologic surgery.

With the building of new veterans' hospitals throughout the country in cities where medical schools are located, there is supposed to be an opportunity for establishing more proctologic services. We, in proctology, should have the same recognition as the other specialties, such as urology, orthopedics, ophthalmology, otolaryngology.

In order to get this recognition the proctologic service should be supervised by one who has had proctologic training and this supervision must be of the type outlined by Dr. Bernstein in his paper.

You, as proctologists, must get in there and work and train your residents. It is not enough to show a resident one or two operations and then tell the resident to go ahead and, if he gets into trouble, to call you. That is not the service that the veteran wants and that is not the type of service that will promote the establishment of residencies in veterans' hospitals. We have the opportunity in these hospitals to demonstrate that proctology should have its own department in the teaching program. Many of our members who have served in this last war will be called upon to do this proctologic surgery. Now is your opportunity to create a department for the veterans' hospital which will also be a teaching department for a medical school.

Dr. Bernstein has presented to you a well planned and well organized teaching service. Ten other hospitals have been approved for residencies and are doing the same type of teaching. The number of teaching hospitals could be doubled easily, so it is up to you who do have the teaching material to apply to the Council on Medical Education and Hospitals of the American Medical Association for permission to establish a residency.

The Proctologic Society has recognized you by making you a member. Now it is up to you to do something for the Society. Let me read again Dr. Bernstein's summary:

"The Veterans' Hospital at Minneapolis is only one of a large number of similar institutions situated close enough to medical teaching centers to carry on extensive teaching programs. The proctology service in every veterans' hospital can be made a very active one. Since estimates from official sources indicate that the Veterans Administration Facilities will not be carrying their peak load until about 1980, it is obvious that Veterans' Hospitals will be a very rich source of clinical material for many years to come. It would be very unwise to fail to take advantage of this source of teaching material for residencies and fellowships in proctology. In hospitals where proctology services are organized and training programs are initiated, the patient is the recipient of better proctologic care and the resident is the recipient of invaluable training and experience."

R. Russell Best (Omaha, Neb.): As Consultant in General Surgery for Area 8 of the Veterans Administration I should like to place a little different angle before you and acquaint you somewhat with the setup of the Medical Department of the Veterans Administration. They have four departments: General Medicine, General Surgery, Tuberculosis and Psychiatry. All surgical specialties come under General Surgery and the same is true in Medicine. There are thirteen branch areas in the country, each with a complete corps of consultants for the specialties and many of the subspecialties.

As to the organization of the proctologic service at the Veterans Hospital in Minneapolis, which is affiliated with the University of Minnesota, I had the opportunity to discuss freely the early organization of this department with Dr. John Paine who was Chief of Surgery. I encouraged Dr. Paine to set up such a service and to rotate the surgical residents through the service insofar as possible. I was very pleased when I learned that Dr. Bernstein would be in charge of this department.

I have its development very closely in view of the fact that each month I receive a report of the operations performed at this Veterans Hospital; and when I visit the hospital, I always take the opportunity to see the department. I believe it has made definite progress.

The only warning that I should like to give is that if you are going to consider establishing a proctologic service in the Veterans Hospital in your locality, please do it in a diplomatic way. The Chief of Surgery in the hospital will make the decision as to whether or not a proctologic service would be of added value to his surgical service. If you go about this undiplomatically and try to force the issue, you will be stepping on someone's toes and the service will not work out satisfactorily. Fortunately, at the University of Minnesota the service has gone along very well; and in a nearby veterans hospital at Fargo, North Dakota, which is not connected with a medical school, we have a good proctologic service.

There is another angle to consider, and I refer to the men—perhaps some of you men here—who are on full time with the Veterans Administration in proctology. If you are in this position, please never get to the place where you think you can separate yourselves from the consulting group in your area. The moment you do that you are setting the Veterans Administration program back, as I believe the key to success depends on the continuation of close cooperation and association with the general medical profession. Previous to the present regimen there were many full time doctors with the Veterans Administration who did not even belong to a medical society. I believe that most men in the Veterans Administration at this time are smart enough to know that the moment they separate themselves from the consulting group and the general profession they are separating themselves from progressive medicine, and their future will not be bright when they do that.

The remark was made that the Veterans Administration is the nucleus of socialized medicine. I do not believe that will develop; I do not want it to happen. If we go along in the proper way in our localities and communities and give proper cooperation to the Veterans Administration, I do not believe this will be such a nucleus. We cannot remove the veterans hospitals from our national program. That is impossible and wrong; but if we

do go along with the program in the correct way and help in the guidance, I believe we can keep it from developing into a socialized form of medicine for the entire population.

CHARLES POPE (Evanston, Ill.): I wish to keep my remarks confined mainly to two points paralleled by similar work in the past. First, my remarks concern pilonidal operations which, of course, can be done in many ways with a successful conclusion. It is interesting to note that the errors as far as technic are concerned were about equal in the closed procedure as in the open procedure in Dr. Bernstein's series of recurrences. This subscribes, I think, to one answer and that is that recurrence is totally dependent upon the pilonidal tissue left and not so much on the technic used. I do not care what type of excision is made; when the wound is closed if no pilonidal tissue remains, we should have no possibility of recurrence. We should always think of recurrence in that guise.

I think I may be permitted to say that at the Hines Hospital they have been using the closed procedure in most of their pilonidal cases in the last year according to the method I have described, and successfully so, according to the operator who has handled the largest number there. I believe it is running close to one hundred such cases. He tells me he is about to publish a paper confirming the method. So while I do not think that the procedure has to be used necessarily, it is proving to be successful.

As far as any changes in technic and handling of these cases is concerned, one does not now have to keep them in bed, as long as one did during the war. Since you have fewer or no malingerers, you handle cases more comfortably and carefully, get them up earlier and do not have to give such a prolonged antibiotic and sulphonamide treatment.

I am particularly interested in another fact that should be close to our hearts, namely, that we have in the veteran's hospital as we had in the U. S. Naval Hospitals the most unusual facilities for a well organized and properly conducted proctologic service for teaching purposes. We might state further that by the good example we set before others so can we show the need for proctology. By the excellent results we obtain I hope these centers will increase.

It is an unusual situation and an example is Minneapolis set up for us with standards maybe more than we can hope for, a Veterans Hospital Proctologic Department, excellently handled and well controlled in all respects by a group of well trained men.

PROCEDURES USED IN TREATMENT OF COMPLICATED FISTULAS

DONALD R. LAIRD, M.D.
Portland, Oregon

THE complicated fistula presents a problem to all of us. No set rule applies in all cases and the principle of fitting the operation to the patient and not the patient to the operation pays dividends in reduced morbidity and improved results. I shall present a description of four procedures useful in handling complicated fistulas and shall discuss the general principles involved in their management.

A thorough knowledge of the anatomy of the rectal outlet and structures adjacent to it is necessary. The prone position is essential and capable assistants provide additional aid. Caudosacral block anesthesia is used in all cases. Low spinal anesthesia is just as effective. General anesthesia provides insufficient relaxation and it is my opinion that when general anesthesia is employed there is definitely more bleeding which hampers dissection and may jeopardize the result.

A few words about the physiology of the anus are in order. No two anuses are alike any more than two faces and bowel habits vary as widely as the personalities of patients. Careful inquiry into the bowel habits of the patient may account for the difference between a good and a bad result. For example, I would exercise extreme caution when considering the problem of incising the anal sphincter of a patient who passes frequent loose stools and who does *not* have well developed anal sphincter muscles. Conversely, if the patient is inclined to be constipated and passes large well formed stools, incision of a large portion of the anal sphincter fibers may be performed without much risk that control of gas and feces will be impaired. It has been my impression that the most external and medial of the anal sphincter muscle fibers exert the greatest conscious control of gas and feces. These are the fibers that have to be incised most frequently during fistulectomy. When extensive incisions of the anal sphincter are necessary, the least serious loss of control occurs when the incision is made directly through the posterior portion of the anal musculature; and the greatest loss of control is produced when the anal sphincters and transverse perineal muscles are incised anteriorly. This is especially true when this procedure is carried out in women.

Occasionally I have seen a patient who has had a third degree laceration of the perineum during childbirth followed by a repair which has resulted in complete loss of control of flatus and serious loss of control of feces. Figure 1 represents the result of healing of a third degree laceration of the perineum. A deep sulcus through the perineal body is shown; the widely separated ends of the torn anal sphincter muscles are attached to the margins of the scar. The following reparative surgical procedure is performed.

OPERATION FOR RELAXED SPHINCTERS

A rectangular flap of skin 4 cm. wide is dissected free beginning at the posterior vaginal fourchet and is extended to the anal verge. (Fig. 2.) As the dissection approaches the anal verge, the tissue flap is increased in thickness to about $\frac{1}{8}$ inch to insure adequate blood supply. If the cut surface of the flap bleeds easily, dissection is extended further into the anal canal keeping the thickness of the dissected flap at about $\frac{1}{8}$ inch. If the blood supply is deemed inadequate, the thickness of the dissected flap may be increased by including more sphincter and rectal wall muscle fibers in the flap. The blood supply of this flap must be adequate for tissue viability even in the presence of some infection. If the anus is extremely relaxed, it may be necessary to remove a wedge of tissue from the perineal body. The deep sulcus thus formed is then closed with one or two layers of vertical mattress sutures of No. 0 chromic catgut or No. 20 cotton suture. Too many sutures should not be used and they should not be tied too tightly as the maintenance of the blood supply of the tissues is important. The skin flap is

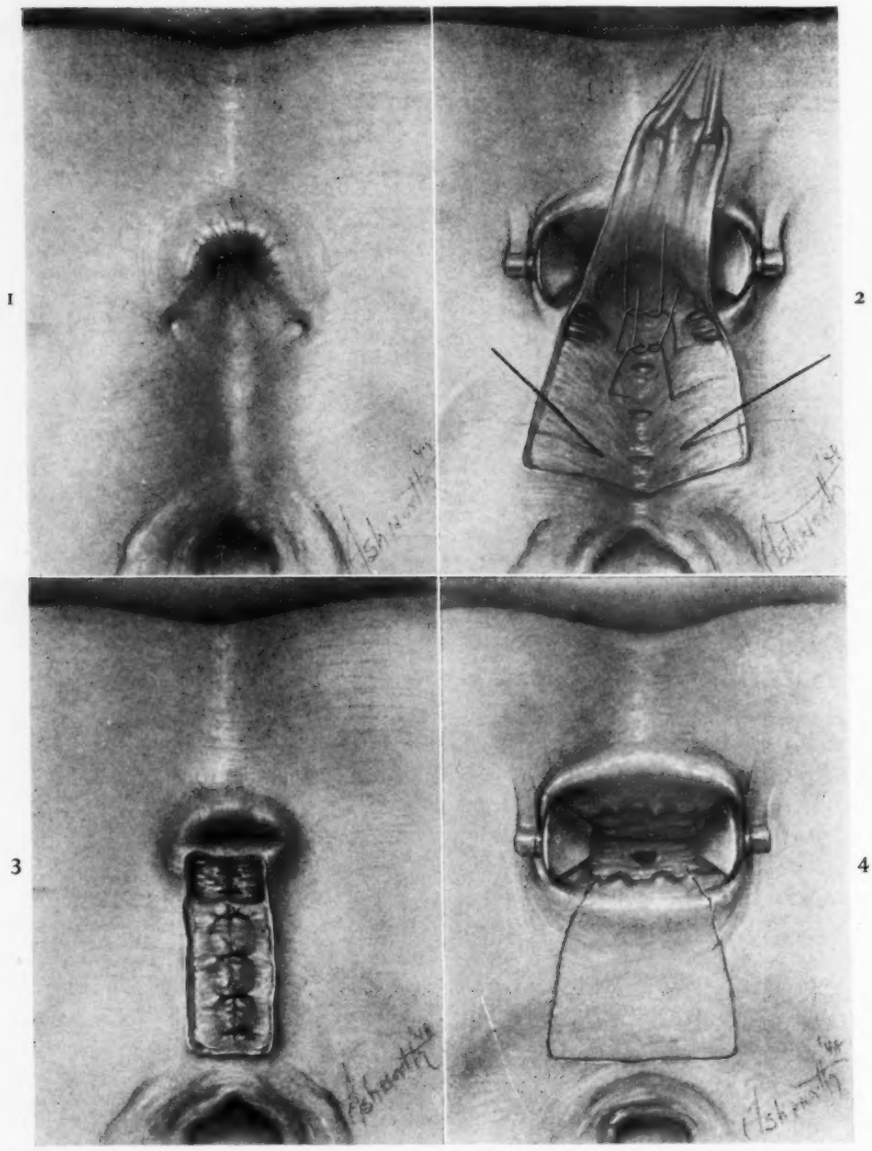


FIG. 1. Shows the healed result of a third degree laceration of the perineum. The retracted ends of the anal sphincter muscles are attached to the scarred surfaces of the deep sulcus.

FIG. 2. Represents the dissection of a wide skin flap over the sulcus. The flap dissection has been extended into the anal canal. The ends of the anal sphincter muscles are left attached to the walls of the sulcus. The first layer of sutures used to close the sulcus is shown.

FIG. 3. Shows the second layer of sutures which completely closes the sulcus and approximates the ends of the anal sphincter muscles. A viable flap of anal mucosa and skin prevents rectal discharges from infecting the deeper part of the sulcus. The skin is not closed.

FIG. 4. Represents a rectovaginal fistulous opening and the line of incision in the skin for the dissection of the flap.

trimmed even with the anal verge and no attempt is made to suture the cut edges of skin over the perineal body. Figure 3 illustrates the finished operation and shows the second layer of mattress sutures which completely closes the sulcus and approximates the ends of the anal sphincter muscles, thus tightening the anus. A viable flap of anal mucosa prevents rectal discharges from infecting the deeper parts of the sulcus. The skin is not closed.

I have successfully used this procedure about twice a year since 1940 for patients having loss of anal sphincter control following third degree perineal lacerations or following extensive fistulectomies.

MUCOSAL FLAP OPERATION

We have all seen women with rectovaginal fistulous tracts in extremely thin-walled, rectovaginal septa on whom previous attempts have been made to close the tract by the vaginal route with the result that the fistula became enlarged after each attempted repair. It is in this type of fistula that the sliding mucosal flap with or without a muscle plug may be used. Figure 4 represents this condition and shows the line of incision in the skin of the perineum beginning 1½ inches anterior to the anal verge being carried into the anal canal and on either side of the primary opening in the rectal mucosa.

Figure 5 shows the dissection of the flap which is composed of skin, rectal mucosa, submucosa and circular fibers of the anorectal wall. The rectovaginal fistulous opening has been closed by two sutures after the margins of the opening have been trimmed free from epithelium. The dotted line indicates the line of amputation of the flap which has been dissected free from the rectal wall 3 to 4 cm. above the rectovaginal opening. After amputation of the excess tissue of the flap its proximal margin is fixed to the sphincter musculature at the level of the dentate margin and held there by interrupted suture.

Extreme care must be exercised to prevent trauma to tissues. The operative result will be jeopardized by tearing the mucosa, by dissecting the flap so thinly that the blood supply is impaired or by suturing the flap to the anal musculature in a manner that puts the suture line under tension.

Figure 6 represents the finished operation. The flap which should include mucosa, submucosa and some circular fibers from the rectal wall has been retracted caudally and sutured to the anal sphincter muscles at the level of the dentate margin.

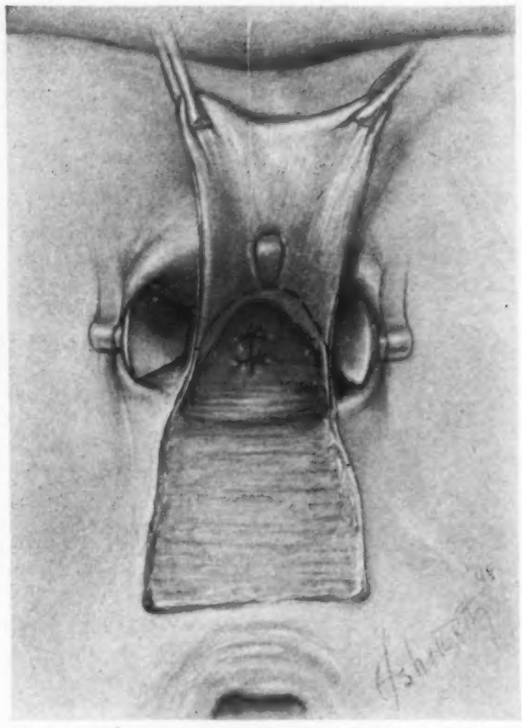


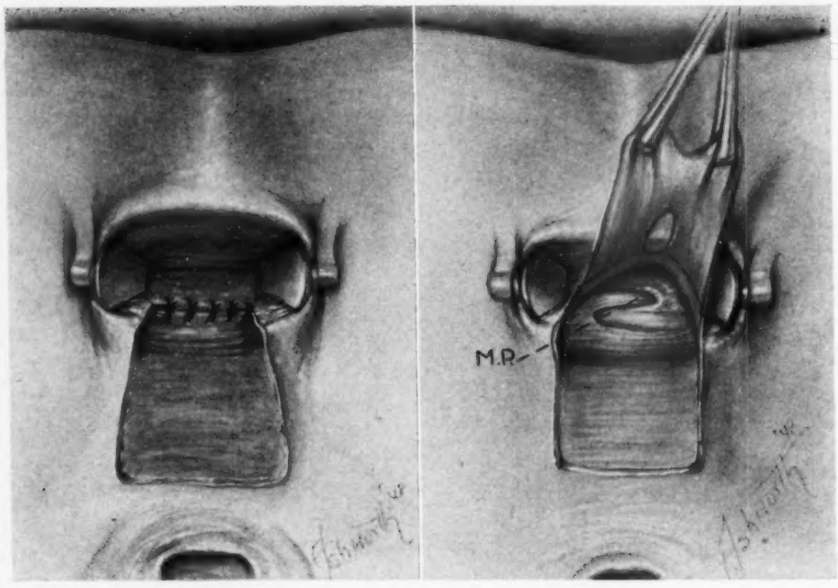
FIG. 5. Shows the dissection of the flap of tissue composed of skin, rectal mucosa, submucosa and circular fibers of the anorectal wall. The rectovaginal fistulous tract has been closed by two sutures after the margins of the tract have been trimmed free from epithelium. The dotted line indicates the line of amputation of the flap.

I have found this procedure completely successful in patients who have relatively thick rectovaginal septa and rectovaginal openings 1 cm. in diameter or less.

MUSCLE PLUG PROCEDURE

For patients who have thin-walled, relatively avascular, rectovaginal septa and rectovaginal openings over 1 cm. in diameter I have used a living muscle plug dissected from the rectal wall to close the opening. (Fig. 7.) I have been unable to find in the literature any reference to this means of closing large fistulous openings. It is rarely necessary to utilize this procedure but under the circumstances illustrated by the following report I am certain it was the only means of achieving a good result.

Mrs. R., an eighty-eight year old obese woman, who had had a severe coronary attack four years previously, was first seen on September 3, 1946.



6 7

FIG. 6. Represents the finished operation. The mucosal flap which should include submucosa and some circular muscle fibers from the rectal wall to insure adequate blood supply has been retracted caudally and sutured to the anal sphincter muscles at the level of the dentate margin.

FIG. 7. Illustrates the muscle plug (MP) filling the large fistulous tract. The dissected flap which is composed of rectal mucosa, submucosa and some circular fibers of rectal musculature has been dissected free from the rectal wall for a distance of 4 to 8 cm. superior to the rectovaginal primary opening. The flap is amputated at the level of the dotted line and the flap is then sutured to the anal sphincter musculature at the normal level of the dentate margin as shown in Figure 6.

At that time I discovered an ulcerating adenocarcinoma 4 by 5 cm. in diameter on the left anterior anorectal wall which involved the anal sphincter and the vaginal wall. Owing to her advanced age, the previous coronary attack and crippling arthritis, an excision of the left anterior rectal wall, the involved anal sphincters and vaginal wall was performed. The defect in the vaginal wall was closed. Due to poor blood supply and a thin rectovaginal septum, a rectovaginal fistula 2 cm. in diameter resulted.

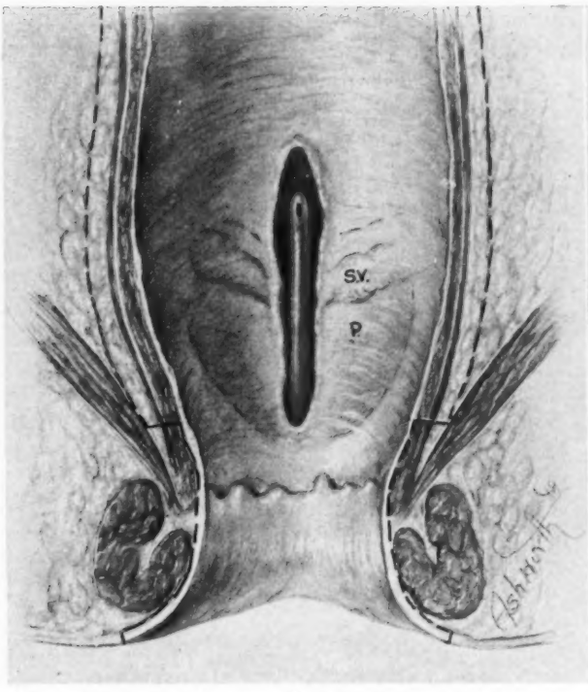
On August 20, 1947, almost one year after the local resection, examination did not reveal evidence of a recurrence of carcinoma; but when the patient strained during defecation, rectal mucosa and the rectal wall prolapsed through the relaxed anal sphincters. The rectovaginal fistula was located 5 cm. above the anal verge in the left anterior rectal quadrant and would admit my index finger. The rectovaginal septum was extremely thin and relatively avascular.

The dissection was carried out as illustrated in Figures 4 and 5. The redundant, thickened mucosa and submucosa of the anterior two-thirds of the rectum were dissected free for a distance of 8 cm. internal to the dentate margin and a cuff of redundant rectal mucosal and submucosal tissue 4.5 by 7 cm. was excised. The rectovaginal fistulous margins were freed from epithelium and a piece of rectal wall muscle which had excellent blood supply was drawn from the rectum through the rectovaginal opening and held by suture placed in the vagina as illustrated in Figure 7. The flap was amputated at the level indicated by the dotted lines and was then sutured to the anal sphincter musculature as shown in Figure 6.

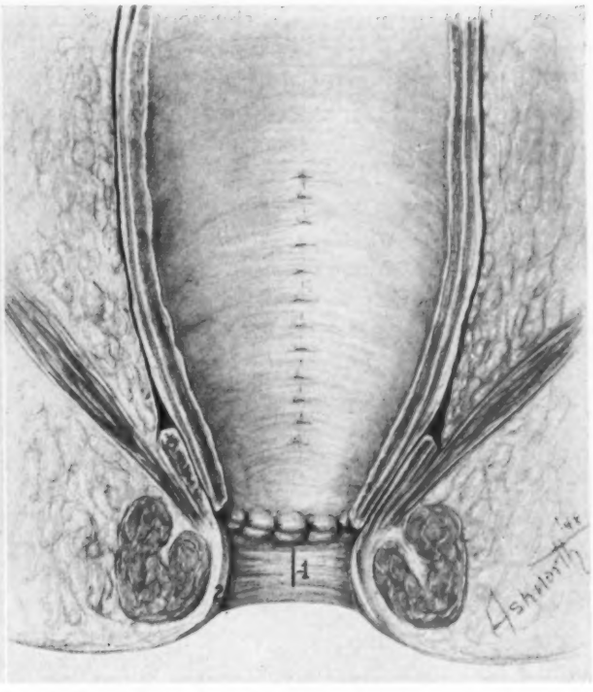
Thus far I have discussed only instances in which large fistulous openings were situated at or internal to the dentate margin anteriorly. The same principles and procedures previously described are just as applicable when the primary fistulous openings occur laterally or posteriorly. I mention the use of the seton only to condemn it. Up to the present time I have not seen a fistula which could be handled better by surgical procedures similar to the ones just mentioned rather than by employing a seton.

MOBILIZATION OF THE RECTUM FOR COMBINED RECTOVAGINAL AND RECTO-URETHRAL FISTULAS

The final procedure which I have called "the mobilization operation" is useful in treating



8



9

FIG. 8. Semidiagrammatic sketch shows the catheter in the urethra and bladder appearing through the defect in the anterior rectal wall. The position of the prostate (P) and seminal vesicles (SV) are indicated by slight shading. The dotted lines indicate the planes of dissection for mobilization of the rectum. The anal and perineal skin (S) of the anterior half of the rectum has been removed as depicted in Figure 7.

FIG. 9. Illustrates the position of the rectum after mobilization and the removal of the segment of rectum containing the defect in the anterior rectal wall. The horizontal lines in the long axis of the anterior rectal wall represent the sutures which close the defect in the bladder and prostatic capsule now covered by the intact mobilized segment of rectum which has been pulled down and sutured to the anal sphincter musculature. The vertical line in the sphincter musculature anteriorly (1) indicates the line of incision in the anal sphincter muscles performed for the double purpose of obtaining adequate exposure and drainage.

combined rectovesical and recto-urethral fistulas. A brief history of one of these patients may be valuable.

A man, aged sixty-three years, was first seen by me March 19, 1947, at the hospital. In 1942 he had a suprapubic prostatectomy. Since that time he had passed all urine per anum and frequently passed flatus and feces through his penis. During the six weeks previous to my first examination there had been two unsuccessful attempts to close a large combined rectovesical and recto-urethral fistula. The patient was emaciated and acutely ill.

A urethral catheter was in place and feces and gas could be seen passing into the urine bottle at his bedside. Digital examination revealed a stenosed anus, and a urethral catheter could be directly palpated through a large defect in the anterior rectal wall. A sigmoidoscope could be passed directly into the bladder. A partially healed incision over the transverse perineal muscles was present. Figure 8 represents the essential findings and the dotted lines indicate the planes of dissection.

Mobilization is begun by dissecting an anterior skin flap as in the previously described procedures. The dotted lines in Figure 8 indicate planes of dissection. Dissection is carried up into the rectum over the anterior three-fourths of the anorectum until it is well above the insertion of the levator ani muscles before the full thickness of the rectal wall is penetrated. The anus is dilated and the sphincter musculature is incised anteriorly to gain exposure for mobilization of the rectum. The margins of the proximal rectum are grasped by forceps and the rectal wall is freed from the prostate and seminal vesicles by sharp dissection. Blunt dissection is used laterally and above the prostate. Dissection laterally should be extended as high as possible and the lateral ligaments of the rectum usually to be divided. Dissection anteriorly necessarily must stop where the peritoneum of the rectovesical pouch is firmly attached to the rectosigmoid which is usually 10 to 11 cm. above the anal verge. In

the patient just mentioned the peritoneum was rather thick and it peeled from the posterior bladder wall rather easily, which allowed the rectum to be retracted caudally further than is usually possible. Extreme care and usually blunt dissection in this region is necessary to avoid damage to the posterior bladder wall and ureters. It is at this stage of the dissection that caudosacral anesthesia is appreciated.

After the rectum has been mobilized as completely as possible the bladder and prostatic epithelium which had grown into the defect in the prostatic capsule and bladder is trimmed away and the defect is closed by interrupted chromic No. 0 sutures. A No. 30 urethral retention catheter is left in the bladder. Cystotomy was not done in this instance.

Figure 9 illustrates position of the rectum after mobilization and removal of the segment of rectum containing the defect in the anterior rectal wall. The numeral (1) indicates the line of incision in the anal sphincter musculature performed for the double purpose of obtaining adequate exposure during operation and for drainage postoperatively. The horizontal lines in the long axis of the anterior rectal wall represent the sutures which close the defect in the bladder and prostatic capsule which is now covered by intact mobilized segment of rectum which has been pulled down and sutured to the sphincter musculature with non-absorbable suture. Actually considerably deeper bites are taken than is shown by the drawing.

One-half inch Penrose drains are placed laterally to drain the supra levator spaces.

Postoperatively this patient received two transfusions and 100,000 units of penicillin at three-hour intervals for a period of two weeks. The Penrose drains in this patient were removed on the fourth postoperative day and the catheter on the twenty-first day. After the removal of the catheter the patient had no difficulty with control of his urine and he gained 20 pounds during the two months following his operation. By September, 1947, he was having a daily formed stool 2 cm. in diameter. His control of flatus and feces was excellent. Examination revealed a slight mucosal ectropion on the left side of the anus.

This procedure of mobilization of the rectum and the removal of a segment has been successfully used twice for conditions identical with the case just described: once for rectal prolapse accompanied by carcinoma, once for extensive adenomatous hyperplasia involving the entire lower rectum and once for stricture of the mid-rectum which followed fulguration of carcinoma.

For the past nine years I have used the aforementioned procedures successfully. I realize that what has been described may have been done previously by some but I have failed to find descriptions in the literature.

DISCUSSION

JULIUS B. CHRISTENSEN (Omaha, Neb.): I will agree with Dr. Laird that sacral or spinal anesthesia is very helpful in surgical treatment of complicated fistulas; but while he insists on the prone position, we operate upon them in a left Sims and probably many of them are done in lithotomy. The author's observations of the differences in musculature of the anus and perineum of these cases is interesting. I do not recall any special studies having been made, but I am sure we all have been guided in our handling of cases of fistula by our evaluation of development of the individual and inquiry as to their bowel habits.

The mucosal flap operation for correction of rectovaginal and vesicular fistulas is successful. Dr. Laird has given the steps in its performance. The procedure of dissecting the mucosal flap and the careful handling of it is the key to success. The flap must be more than mucosa thick. The larger it is, the more submucosal and muscle tissue should be mobilized. The tissue must survive trauma, infection and constriction. Never enlarge a small flap by stretching or thinning it. Apply your "T" forceps to the lower edge only and resect this devitalized tissue before suturing. One careless application of a hemostat on the flap may cause the tissue to break down and the fistula will recur. It is so important that the operation be a success that I denude the anal margin in that quadrant about 1 cm. below the dentate line and suture the flap to this lower level.

I question the necessity of always closing the tissues of the vaginal wall. This is often difficult to perform and always seals up blood, serum and potential infection beneath your mucosal flap. In these cases we have had success leaving this defect open to granulate.

Mobilizing a plug of muscle tissue is new to me, and I believe it could be helpful in case of a large defect. I expect that any muscle would in time be replaced by fibrous tissue.

We still use a seton in the treatment of very complicated anal fistulas. When operating upon a fistula in multiple stages attempting to preserve the sphincter muscle, the seton is helpful in providing drainage and easy identification of the remaining tract. We do not use it on any of the types of cases discussed in this paper.

The urologists were the first to attempt the cure of urethrorecto fistula. It is interesting to note that

they described the opening in the rectum as viewed through the cystoscope, and a proctologist looked into the bladder with a proctoscope.

Drs. Hugh Young, and Harvey Stone, in Baltimore, reported three cases in 1913 treated successfully in this manner, and four years later eight more with one failure. Others have since reported similar success with only minor changes in bladder drainage, preparation and chemotherapy. A point of practical importance is to begin the dissection of the mucosa in the posterior quadrant. It is easier to find the plane of cleavage here and this area is free of scarring and infection. More bleeding will be encountered about the fistula opening which is best approached from either side. The dissection must go well above the fistula opening to enable the bowel to be sufficiently prolapsed to resect the fistula. We cure the fistula and end up with a colostomy planted in the anal sphincter, but it is still a good operation for this very distressing condition.

R. J. Jackman (Rochester, Minn.): I shall confine my remarks to two phases of Dr. Laird's paper: (1) the factor of "rectal incontinence" and (2) "low-lying" rectovaginal fistulas.

The surgeon's fear of producing rectal incontinence is responsible in many instances for inadequate or incomplete surgery in operations for fistula, and thereby he is actively promoting what he is trying to avoid. The infection in the tissue continues to spread, producing scar and destroying or immobilizing muscles, so that many patients with extensive fistulas who have never had any surgical treatment or perhaps inadequate surgical treatment have a variable degree of incontinence.

The term "rectal incontinence" is a relative one and the degree of incontinence is dependent on many factors, such as the consistency of the stool as well as the intelligence and personality structure of the individual. On one extreme is the patient with a perineal colonic stoma, who objectively is completely devoid of anal muscular control but who subjectively reports that his control is good. This patient, in his own mind, rationalizes that his life has been spared because a rectal cancer was removed; hence, any subjective evidence of incontinence or whatever difficulty he might have is placed in the background. On the other extreme, the fastidious patient, who may have a postoperative fistulectomy sulcus through which a little mucus leaks, may be extremely unhappy.

To me, therefore, one of the biggest factors in determining which patient may or may not have rectal incontinence is an analysis of his mental make-up as well as history relevant to the nature of his bowel habits. Deferred or inadequate surgical treatment promotes incontinence. Prolonged postoperative packing of fistulectomy wounds should be avoided because it promotes formation of a wide block of scar which acts as a mechanical impediment to satisfactory functioning of the anal sphincter.

Dr. B. T. Daniels, a graduate student in surgery in the Mayo Foundation, has given me permission to use unpublished figures arrived at in the development of his thesis on rectovaginal fistulas. Daniels found that in a forty-year period (1907 to 1947) only 554 patients (exclusive of those who had congenital rectovaginal fistulas) had been to the Mayo Clinic with rectovaginal fistulas of all types and due to many different causes. Fortunately, rectovaginal fistulas are relatively uncommon; they probably constitute less than 5 per cent of all anorectal fistulas.

One group of the 258 patients treated surgically was large enough to permit statistical analysis. This group consisted of patients who had "low-lying" small fistulas; that is, those fistulas with a diameter of up to 5 mm. and with a rectal source at or near the dentate margin and a vaginal source at or just inside the posterior fourchet. The condition of ninety-seven patients in this group was followed. The fistulas of twenty-four of these ninety-seven patients were caused by some anorectal inflammatory process. Fifty-two fistulas were the result of childbirth lacerations and the remaining twenty-one had occurred because of numerous miscellaneous causes, including perineorrhaphy, hemorrhoidectomy, chronic ulcerative colitis, trauma and vaginal reconstruction. Several had no known cause.

Twenty-six of these patients with low-lying, small fistulas were treated by some sort of plastic operation which included such procedures as (1) a simple layer separation and repair of the defect after excision of the fistula, (2) inversion of the tract into the rectum followed by excision after purse-string suture of the defect or (3) some modification of the mucosal flap type of operation described by Dr. Laird, also known as the "Elting" or "Noble" operation. Thirty-eight per cent of these patients had recurrences.

For fifty-seven of these patients with low-lying small fistulas the same sort of plastic repair previously mentioned was carried out but, in addition, perineorrhaphy was done. The recurrence rate in this group was 40 per cent.

The remaining fourteen patients in this group which had low-lying small fistulas were treated by an unroofing operation. Only two, both of whom had chronic ulcerative colitis, had a recurrence. The recurrence rate here was 9 per cent.

In conclusion, we can state that (1) rectovaginal fistulas are relatively uncommon and (2) failures after surgical treatment are numerous and the type of procedure used should be fitted to the patient depending on the location, size and cause of the fistula. Probably the most satisfactory

procedure in the treatment of low-lying rectovaginal fistulas is the simple unroofing operation, with immediate or, in some instances, subsequent perineorrhaphy after the infection has subsided.

In most instances of low-lying rectovaginal fistulas, it is our opinion that the same principles of surgery hold as apply in other anorectal fistulas; that is, conversion of the fistulous tract into an open wound ("unroofing operation"). This may be sufficient to take care of the problem. If it is believed that perineal repair should be done, in many instances it is better to do this at a later stage, after infection has subsided and blood supply has improved. In either event, in the performance of perineal repair all sphincter muscle resistance and overhanging ledges distal to the rectovaginal fistula should be eliminated by not suturing the inner or medial part of the anal sphincters; thus, the patient will be temporarily incontinent, but as the scar forms, the muscle ends gradually will be pulled together.

Howard K. Belnap (Ogden, Utah): Last year at Atlantic City Dr. Laird described this third operating procedure to me. Upon his recommendation I operated upon a patient who a year previous had had radium inserted in the cervix for treatment of carcinoma. As a result of this radiation she developed a radiation proctitis that resulted in a stricture of the rectum at the level of the cervix with a sloughing of the rectovaginal wall both above and below the stricture, resulting in rectovaginal fistulas. Both of these were large enough to admit the index finger.

The operation as described by Dr. Laird gave no trouble except there was considerable bleeding from the right middle hemorrhoidal artery which was a little difficult to control. The end results were excellent, the patient having complete control of her bowels and there has been no recurrence of the fistula.

I believe that this procedure has two definite advantages: (1) There is no suturing of the rectal wall through which a possible fistula may occur; (2) it restores the normal lumen of the rectal area to the bowel.

Donald R. Laird (closing): I want to thank Dr. Christensen, Dr. Jackman and Dr. Belnap for their discussion. Dr. Christensen mentioned that he did not use the prone position in his operative work. I am sure that in the mobilization operation he would find the prone position a great aid. In repairing rectovaginal fistulas Dr. Christensen also leaves the vaginal side open to allow for drainage of serum or pus which might develop.

Dr. Jackman mentioned that rectal incontinence is due mainly to the mental make-up of the patient. This certainly is true and it is possible to minimize greatly the number of complaints of incontinence by carefully explaining to patients what to expect as a result of their operation. If the patient is not told how his rectum will feel after surgery and how it will function, the patient will think that because his anus does not feel or function the same after surgery as it did before something went wrong at surgery or that the wound is not healing properly. If, however, patients have been told in words that are plain what to expect when a portion of the sphincter muscles have to be incised, it makes them very much easier to live with. It pays to take this time and trouble.

ONE YEAR'S TREATMENT OF NON-SPECIFIC ULCERATIVE COLITIS WITH INTESTINAL EXTRACT*

BENJAMIN HASKELL, M.D. AND M. H. F. FRIEDMAN, PH.D.
Philadelphia, Pennsylvania

AS reported elsewhere,[1] we entertained the possibility that non-specific ulcerative colitis is due to a deficiency of an intrinsic protective factor which is present normally in the bowel mucosa. This view would bring into accord a mass of apparently conflicting evidence.

TABLE I

Duration of Symptoms:	
Less than 1 yr	8
1 to 3 yr	14
More than 3 yr	5
Bowel Segment Involved:	
Rectosigmoid only	9
Rectum to hepatic flexure	8
Whole colon	7
Indeterminate*	3
Bowel Movements:	
Marked diarrhea	13
Intermittant diarrhea	7
Formed stool regularly	3
Constipation	4

* Rectosigmoid involved but upper limits of disease process not determined.

In March, 1947, we[1] summarized the results of short term treatment with extracts of hog's intestinal mucosa in a small series of patients suffering with non-specific ulcerative colitis. After our study had been in progress for several months, our attention was directed to similar experiments conducted by Gill[2] in England. Improvement was shown by twelve of his eighteen patients who had been fed large amounts of either raw or dried preparations of pig's small intestine. The maximum beneficial effects were obtained only on continued treatment with the intestinal substance. Gill believed his results indicated that ulcerative colitis could be attributed to the lack of some factor which is produced in or by some portion of the small intestine. A similar concept that ulcerative colitis is in the nature of a deficiency disease was also advanced by Brown[3] in 1925.

To date we have treated seventy-one patients, but in most cases the time interval which has elapsed since treatment was begun has been too short to permit evaluation of the results. The present report is, therefore, restricted to a study of twenty-seven patients who have been under treatment for a minimum period of one year. (Table I.) Included in this group are eight men and nineteen women whose ages range from sixteen to fifty-seven years. Several patients presented histories suggesting that the onset of the disease occurred as long as fifteen to twenty years prior to commencement of this study, but the longest period of illness actually confirmed by our own clinic records was thirteen years. Six women patients were ill enough to require hospitalization at the time treatment with intestinal extracts was instituted, and at least three of these had been admitted to the hospital for surgical treatment. With the exception of one patient with two small polypi in the rectal ampulla, none of this group of twenty-seven showed polypoid degeneration. Two patients had an associated arthritis and one had a moderate intermittent erythema nodosum.

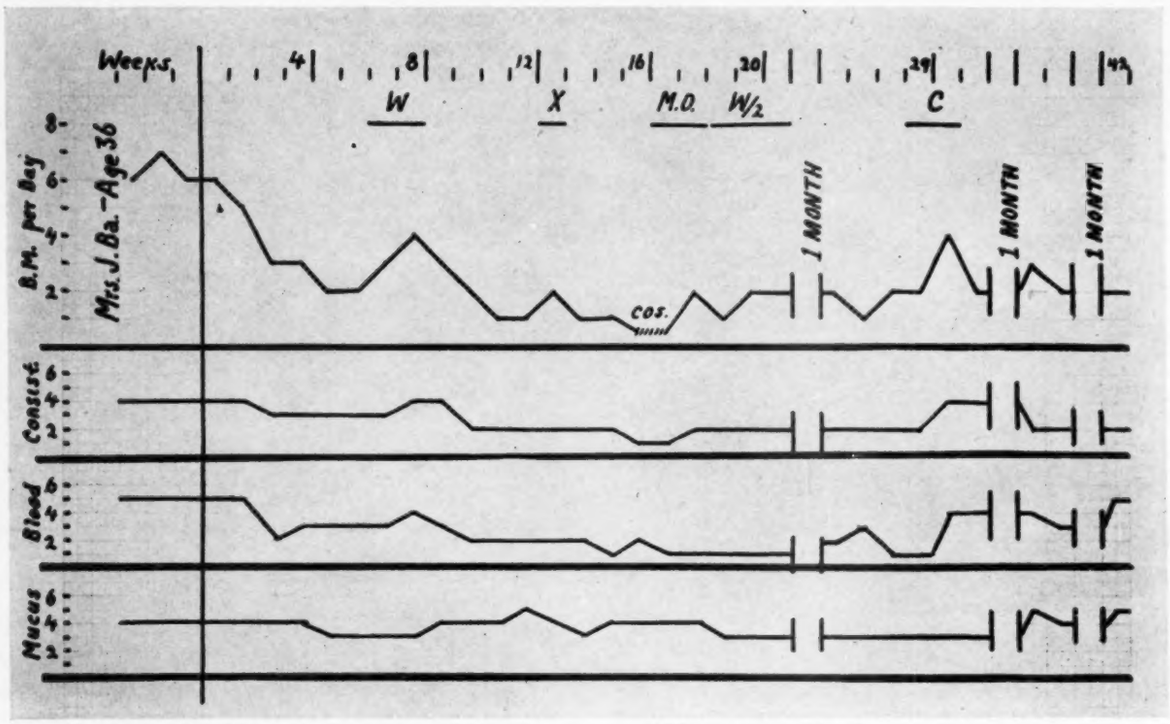
TABLE II

Index	Stool Liquid	Blood Present	Mucus Present
5	Each B.M.* every day	Each B.M. every day	Each B.M. every day
4	Some B.M. every day	Some B.M. every day	Some B.M. every day
3	Some B.M. some days	Some B.M. some days	Some B.M. some days
2	None	Uncertain	Uncertain
1	Costive	None	None

* B.M.—bowel movement.

Diagnosis in each case was established on the basis of clinical history, sigmoidoscopy, roentgenologic bowel studies, examination of the stools and repeated stool cultures which were negative for pathogenic organisms. The

* From the Proctologic Division of the Department of Surgery and the Department of Physiology, Jefferson Medical College and Hospital, Philadelphia, Pa. Aided by a grant from Wyeth, Incorporated. The following have participated in this investigation: Drs. J. D. Allen, W. J. Snape and J. M. Waldron.



W—extract withdrawn
X—husband hospitalized for surgery
Cos—patient costive, defecation uncomfortable
MO—mineral oil taken
W/2—extract reduced to one-half previous dose
C—severe upper respiratory tract infection

FIG. 1. Mrs. J. Ba., age thirty-six, suffered with non-specific ulcerative colitis for three and one-half years. Extract administered at point indicated by vertical line. Except during periods marked "W" and "W/2," the dosage level ranged from 75 to 40 Gm. per day. About the fortieth week the patient complained of severe anal pain. Examination revealed a bleeding anal fissure. Sigmoidoscopic examination showed the mucosa to be practically normal except for a small granular area about 1 inch above the anorectal line. The indices for the ordinates are explained in the text.

same criteria were used for evaluating the results of treatment. Sigmoidoscopic examination of the bowel mucosa was made at intervals

TABLE III

Evidence of Improvement:	
Symptomatic and sigmoidoscopic	13
Sigmoidoscopic only	8
Symptomatic only	3
No improvement noted	3

and roentgenographic studies of the colon following barium enema also were conducted. Daily records included the frequency of bowel movement, consistency of the stool, presence of blood and mucus, occurrence of pain, dates of menstrual flow and the presence of upper respiratory infections. An attempt was made to grade the severity of the bowel symptoms by the adoption of numerical indices for consistency of the stool, presence of gross blood and presence of mucus. (Table II.)

The procedure employed for preparation of the intestinal extract used in this study is described elsewhere. From 50 to 100 Gm. were administered daily in divided doses. The material was provided either as a powder or in a granular form. Treatment continued for several months at this dosage level and was reduced or withdrawn when improvement was well marked. Placebos consisted of either enteric-coated lactose tablets or a dried preparation of powdered meat and casein with a protein content equivalent to the extract.

RESULTS

The results of this study are summarized in Table III and the progress of a typical case is shown in Figure 1. The two most striking signs of improvement were the decrease in the frequency of bowel movements and the disappearance of gross blood from the stool. In patients in whom frequency of defecation was not a marked symptom the disappearance of blood was the first noticeable sign of improvement. The mucus content of the stool was also greatly reduced during treatment, the decrease roughly paralleling the decrease in gross blood.

In general, improvement was first noted after two to five weeks of treatment with intestinal extracts. In patients with illness of less than one year's duration the improvement was more prompt than in patients ill two or more years. It is possible that a more prompt therapeutic response might have been obtained if the extract had been administered in larger doses.

It has been observed commonly in chronic ulcerative colitis that an exacerbation frequently follows respiratory tract infections. In the present series nearly all patients suffered acute colds during the year and in most of them a flare-up of symptoms resulted. However, the bowel symptoms appeared to be less intense and subsided sooner than on previous occasions. Several patients who experienced mild exacerbations during each menstrual period reported a diminution of these periodic symptoms following the use of intestinal extract.

Sigmoidoscopic evidence of healing followed an interesting and somewhat unexpected pattern. Symptomatic improvement occurred in nearly every instance before well defined reparative changes appeared in the bowel mucosa. Sometimes this interval was as long as one month. The first change noted was a decrease in friability. This was later followed by healing of the ulcers and a slow disappearance of the diffuse granular changes. The mucosal improvement began at the proximal limits of the diseased area and gradually extended caudad. This was evident on direct sigmoidoscopy or by barium enema study in those cases with involvement above the lower sigmoid. The rectum was the last area to heal. Some degree of tenesmus persisted in several patients even though the number of stools had been reduced to one or two per day. This symptom was present as long as the lower rectal mucosa showed inflammatory change.

X-ray findings yielded little additional information in most of the patients with the disease processes limited to the rectum and lower sigmoid. It is well known that lesions in this area may show no radiologic changes from the normal.[4] Patients with extensive involvement of the colon showed roentgenologic evidence of improvement in only three instances. In six other patients who were severely ill no marked changes have been noted as yet. The advanced fibrosis present in severe cases may not be reversible even when there is evidence of mucosal healing and symptomatic improvement.

COMMENT

Lesions of the colon which have been produced experimentally are of an acute nature and heal rapidly without becoming chronic.[5] In the absence of an animal assay method, standardization of potency must be carried out upon patients with the disease. Nonspecific ulcerative colitis is a chronic disease showing periods of remissions and relapses which appear to be spontaneous. In most cases a distinct psychogenic factor[6] also appears to be present. Consequently, one might expect a certain number of patients to show some response to non-specific therapy. The efficacy of therapy can be determined only by rigidly controlled studies on a large series of patients and by long periods of adequate observations.[7] In the present study the relapses which occurred following withdrawal of the therapeutic agent or substitution of a placebo served to evaluate the specificity of the extract.

Several procedures described elsewhere[8] were used in the preparation of the extract of intestinal mucosa. It was soon found that only certain extracts were effective and that others contributed no benefits whatsoever. It should be emphasized that the potency of these preparations cannot be determined at present by any of its physical attributes or chemical properties. The only test for potency now available is the effect of the preparation on patients. *Particular caution* is necessary to distinguish between the effects of the therapeutic agent and spontaneous remissions.

We believe that the results of this study still offer only presumptive evidence that nonspecific ulcerative colitis is due to a deficiency of an intrinsic factor. Symptomatic improvement and healing of the ulcerated areas occurred in association with treatment with intestinal extracts and did not appear to be spontaneous remissions of the disease.

It is probable that in this study the beneficial effects of intestinal extracts would have been more striking if we had "treated the patients as well as the disease." However, this was not done since such a course would have given us less information about the effectiveness of the intestinal extracts.

At present the exact mechanism of the therapeutic response is unknown. It is hoped

that further study will clarify this problem. The exacerbations which occurred on withdrawal of treatment suggest that sustained improvement may be possible only as long as therapy with the intestinal extract is maintained.

SUMMARY

To test the hypothesis that non-specific ulcerative colitis is due to the absence or a deficiency of an intrinsic factor normally present in the intestinal mucosa, oral treatment with extracts of hog's small intestinal mucosa was undertaken in seventy-one patients. A total of twenty-seven of these patients have been followed for one year or longer. Symptomatic and sigmoidoscopic evidences of improvement were shown in twenty-four cases. After remission of symptoms, withdrawal of the intestinal extract or substitution of a placebo resulted in relapse, with remission occurring again upon resumption of treatment. It is probable that sustained improvement can be maintained only by continued administration of the extract.

REFERENCES

1. Friedman, M. H. F., Haskell, B. F. and Snape, W. J. *Federation Proc.*, 6: 107, 1947. Idem. *Proc. Canad. Physiol. Soc.*, 11th Ann. Meet., p. 10, October, 1947.
2. Gill, A. M. *Proc. Roy. Soc. Med.*, 39: 517, 1946.
3. Brown, T. R. *Ann. C. Med.*, 4: 425, 1925.
4. Bockus, H. L. Gastroenterology. Philadelphia, 1944. W. B. Saunders. Ricketts, W. E., Kirsner, J. B. and Palmer, W. L. *Gastroenterology*, 10: 1, 1948.
5. Ginsberg, R. S. and Ivy, A. C. *Gastroenterology*, 7: 67, 1946.
6. Murray, C. D. *Am. J. M. Sc.*, 180: 239, 1930. Sullivan, A. J. *Am. J. Digest. Dis.*, 2: 651, 1936.
7. Kiefer, E. D. *Gastroenterology*, 10: 16, 1948.
8. Friedman, M. H. F. and Haskell, B. F. To be published.

SURGICAL TREATMENT OF NON-SPECIFIC ULCERATIVE COLITIS

WALTER A. FANSLER, M.D. AND HOWARD M. FRYKMAN, M.D.
Minneapolis, Minnesota

SURGERY in idiopathic ulcerative colitis may be indicated in either the acute or chronic type of the disease. Since many patients with ulcerative colitis can be managed successfully by medical treatment, it is important to determine which patient should be subjected to surgery. For practical purposes the disease can be classified into three groups, including the mild type, the moderately severe, continuous or recurring types and the fulminating type.

The mild type with its typical periods of activity and quiescence usually offers little inconvenience to the patient other than the passage of blood and mucus with frequent loose or soft stools. In these cases proctoscopic examination shows merely a red and granular mucosa with no frank ulceration. There are no constitutional symptoms and x-ray studies are frequently negative or may show only slight spasticity. Frequently when these patients are examined during a quiescent period, a normal mucosal pattern will be found with no evidence of ulcerative colitis ever being present. The majority of these patients with mild ulcerative colitis respond well to medical management and surgical intervention is usually not indicated.

The fulminating type of case may develop suddenly in a previously normal individual or it may occur as an overwhelming exacerbation in the mild type or moderately severe group. It is characterized by severe toxicity, highly elevated temperatures and severe, crampy, abdominal pain along with profuse liquid stools consisting almost entirely of blood, pus and mucus. The mortality is very high in this type of disease regardless of what is done, with death resulting from toxemia, perforation and peritonitis or profuse hemorrhage from the colon. Surgery is indicated as an emergency procedure in these cases. The only indication for delay is for the utilization of transfusions and other emergency supportive measures in preparation for surgery. As a general rule the earlier these patients are operated upon the lower will be the overall mortality. Ileostomy is the present procedure of choice but it is possible that in the future transthoracic vagotomy may supplant it.

The great majority of ulcerative colitis patients are classified in the moderately severe, continuous or recurrent group. This type is usually characterized by remissions and exacerbations although the activity may be continuous with gradual progression of the disease. In over 90 per cent the disease process begins in the rectum and extends in a proximal[9] direction until the entire colon is involved. Chronic ulceration of the mucosa and the infiltration of the bowel wall by the inflammatory process gradually converts the colon into a greatly thickened and markedly shortened fibrotic tube. During exacerbations varying degrees of toxemia are evident due to absorption from the diseased bowel with associated fever, anemia and loss of weight. Severe irreversible changes may occur within the bowel in a relatively short time or remissions lasting months or years may occur. All such cases should be given trials with an adequate medical regimen during the early phases of the disease but surgery is definitely indicated if the patient has frequent disabling recurrences or if the condition appears to show active progression. Surgical procrastination will not only lead to destruction of the colon both anatomically and physiologically but may ultimately lead to the development of such complications as arthritis, stricture formation, anal and rectal fistulas, recurrent thrombophlebitis, perforation, hemorrhage, polyposis and malignancy. Delay until surgical intervention becomes imperative also greatly increases the operative risk.

At the present time there is no yardstick which will definitely indicate when to abandon conservative measures and resort to surgery. This point varies with individual opinion and experience but it is obvious that the more recent trend is toward earlier and more frequent surgical intervention. Operations found

most useful are (1) ileostomy alone; (2) ileostomy with complete colectomy, with or without removal of the rectum; (3) partial or complete colectomy with anastomosis of the ileum to the remaining segment of colon or rectum and (4) vagotomy. Ileostomy alone as a permanent measure is usually not satisfactory except in early cases. The colon is often so badly diseased that even though it is placed at complete rest it continues to remain a source of infection. Troublesome complications may occur or, if already present, they usually persist until the colon is removed. There is also the ever present danger of malignant degeneration in long-standing cases of ulcerative colitis. Statistics as to the frequency of this condition vary from 2 per cent as reported by the Lahey Clinic to 13 per cent as found by Dennis at the University of Minnesota. Therefore, it is better that the colon be removed with or without the rectum. If the colon and/or rectum is left intact, it should be carefully examined at frequent intervals for evidence of polyp formation or early malignancy.

From the patient's point of view a partial removal of the large bowel with anastomosis of the ileum to the remaining pelvic colon is the most acceptable procedure since the continuity of the bowel is not interrupted and the inconvenience of an ileostomy is obviated. This can be readily accomplished in the uncommon, segmental type of ulcerative colitis in which the rectum remains normal. If minimal to moderate rectal changes are present with a more extensive disturbance higher in the colon, there are two possibilities: The first and most generally accepted procedure is to perform an ileostomy and resect the colon as far as the rectum, leaving that organ intact. At a later date if the disease process in the remaining segment subsides, an ileorectal anastomosis may be done. Garlock and Cave have reported several cases in which this procedure was done without subsequent recurrence. However, reactivation of the disease does occur frequently in the rectal stump. The process may be so mild that no further treatment is indicated or the recurrence may be so severe that restoration of the ileostomy and ultimate excision of the rectum may be necessary.

The other possibility is the anastomosis of the ileum to the rectum at the time of the colectomy even though minimal rectal changes are present. In one instance this was done. Prior to the operation the mucosa was edematous and granular in appearance and bled easily upon swabbing. No distinct ulcerations were present and the rectal distensibility was about normal. In the two years which have elapsed the condition of the rectum has remained unchanged. The patient has several soft stools daily and occasionally passes a small amount of blood. Her general health is good and she prefers her present status to one with a permanent ileostomy. Whether this patient will improve, continue on in her present state or require re-establishment of the ileostomy is a problem for the future. Wangensteen has reported two cases in which colectomy was done with anastomosis of the terminal ileum to the remaining pelvic colon even though proctoscopic examination showed activity of the disease process. In these cases this procedure was followed by complete healing of the rectal stump.

It is our belief that if an ileoproctostomy is done the anastomosis should never be made lower than the upper portion of the rectal ampulla. If the suture line is placed too near the anal canal, stricture formation at the site of the anastomosis and poor bowel control usually occur. Constant soiling by the dribbling of the ileal contents causes the perianal skin to become macerated and painful. If the entire rectum is removed and the ileum brought out through the anal canal, the results are even worse. A permanent ileostomy with a Rutzen bag is far more comfortable and satisfactory.

We use a single barrel or end ileostomy with the proximal ileum being brought out through a separate incision while the distal end is inverted and dropped back into the peritoneal cavity. The mesentery is carefully sutured to the peritoneum of the anterior abdominal wall as insurance against retraction or external prolapse of the ileum. We no longer anchor the ileum to the parietal peritoneum by placing sutures in the wall of the bowel itself since even with the use of the finest needles and suture we have frequently had sinus formation occur.

Until recently surgical treatment of ulcerative colitis has been directed entirely toward the intestinal tract. In October, 1946 Dr. Clarence Dennis at the University of Minnesota performed a transthoracic vagotomy for this condition. In March, 1948 he reported nineteen cases in which he had done a bilateral

vagotomy for the treatment of idiopathic ulcerative colitis and regional enteritis. of this group 73 per cent had either shown definite improvement or had become entirely asymptomatic.

One of us (H. M. F.) has had the opportunity of making proctoscopic observations on a considerable number of the patients in the series of Dr. Dennis and was so impressed that the procedure was recommended to several patients under our care. We had four patients in whom transthoracic vagotomy was done. The first patient in our very small series was operated upon eleven months ago and the latest four months ago. Obviously the time is too short and the series too small to come to any definite conclusions. However, from the observations made on the few patients reported in this paper and from examinations made in conjunction with Dr. Dennis it would seem almost certain that transthoracic vagotomy will have a definite place in the treatment of idiopathic ulcerative colitis in the future.

Our patients had a history of the disease process varying from eight to nineteen years with numerous remissions and exacerbations. In one case there had been a complete remission for almost ten years. Vagotomy was done in each case during a period of acute exacerbation which was not responding to medical management. All showed typical x-ray changes with ulceration of the mucosa, shortening of the colon and loss of haustrations. To date three of these patients have shown marked improvement after years of prolonged illness. All have had weight gains with improvement in their general health. One patient showed a completely healed rectum and distal sigmoid colon three months after surgery. Considerable scarring was evident but the colonic mucosa was otherwise pale and normal throughout. He now has from one to three or four soft stools daily. The remaining two patients still show patchy granular areas but slow improvement in the appearance of the mucosa is apparent at each subsequent examination. All are having soft stools varying from two to five daily with rare traces of blood. Barium enemas at varying intervals postoperatively have shown the mucosal pattern to be improving but no change has occurred in the irreversible constriction of the colon. These three patients are now gainfully employed at their previous occupations.

The patient who made the least improvement was a forty-seven year old, white female with a seventeen-year history of ulcerative colitis. At the time we first observed her she had severe exacerbation of the disease with eight to ten stools daily. Barium enema showed extensive involvement of the entire colon with marked shortening and complete loss of haustrations plus questionable involvement of the terminal ileum. A transthoracic vagotomy was done seven months ago. During the first five months postoperatively she showed no subjective improvement and at times was definitely worse with often twelve to fifteen stools daily. However, her condition has improved in the past two months, with a 10 pound gain in weight and a decrease in the number of daily bowel movements. She remains a chronic invalid and still passes three to eight stools daily containing small amounts of blood and pus. Proctoscopic examination now shows some improvement; but unless there is further favorable change in the appearance of the bowel and in the general condition of the patient, this result must be considered unsatisfactory. Ileostomy and, ultimately, total colectomy may be necessary to restore this patient to a state of comparative health.

Another patient, nineteen years old, who was seen in consultation and already reported in Dennis' series, had an acute fulminating type of the disease having been in good health until about four weeks prior to the examination. He appeared acutely ill with all the signs and symptoms of acute sepsis. He had been having severe abdominal cramps and profuse diarrhea since the onset of his illness and had lost approximately 50 pounds. Barium studies of the intestinal tract showed that the ulcerative process involved not only the colon but also the ileum and jejunum as well. A transthoracic vagotomy in this patient was followed by immediate clinical improvement; and when the patient was seen again three months later, he had gained 30 pounds in weight and had returned to school. He had no complaints of any kind and was passing one formed stool daily.

SUMMARY AND CONCLUSIONS

From our observations it is evident that properly selected patients with ideopathic ulcerative colitis will show improvement or apparent cure following transthoracic vago-

tomy. The most striking results have been in the acute fulminating type of the disease and it is in this group that the highest operative mortality has been previously encountered with the use of emergency ileostomy. In our series the procedure has been used in four patients with chronic ulcerative colitis, with varying results. One patient appears to be cured, two show marked improvement and the fourth shows moderate improvement. Considerable time must elapse before it can be determined whether complete resolution of the chronic inflammatory process will occur or whether these results will be permanent. In general the procedure seems more applicable in the acute and early chronic types of the disease before irreparable damage to the colon has occurred. In the intractable cases in which the colon has been converted into a thickened, fibrotic tube lined chiefly with infected granulation tissue and in those showing evidence of polyp formation, the methods of intestinal surgery as outlined in this presentation are the procedures of choice.

REFERENCES

1. Bargen, J. A., Jackman, R. J. and Kerr, J. M. Influence of certain antispasmodic drugs on the intestine of man. *Ann. Int. Med.*, 12: 339, 1938.
2. Cattell, R. B. and Boehme, E. J. Carcinoma of cecum; successful resection in 92 year old man. *Gastroenterology*, 8: 695, 1947.
3. Cattell, R. B. The care of ileostomy. *Labey Clin. Bull.*, 4: 45, 1944.
4. Cave, Henry W. Late results in ulcerative colitis. *Ann. Surg.*, 124: 717, 1946.
5. Dennis, Clarence. Ileostomy and colectomy in chronic colitis. *Surgery*, 18: 435, 1945.
6. Dennis, Clarence, Eddy, Frank D. and Westover, Darrell. Vagotomy in the treatment of idiopathic ulcerative colitis and regional enteritis. *Minnesota Med.*, 31: 253, 1948.
7. Garlock, John H. Further experiences with surgical treatment of intractable ulcerative colitis. *New York State J. Med.*, 45: 1309, 1945.
8. Jackman, R. J., Bargen, J. A. and Helmholz, H. F. Life histories of 95 children with chronic colitis. Statistical study based on comparison with whole group. *Am. J. Dis. Child.*, 59: 459, 1940.
9. Jones, Thomas E. Surgical treatment of ulcerative colitis. *J. A. M. A.*, 111: 2076, 1938.
10. Wangensteen, O. H. and Toon, R. W. Primary resection of colon and rectum with particular reference to cancer and ulcerative colitis. *Am. J. Surg.*, 75: 384, 1948.

DISCUSSION OF PAPERS BY DRS. HASKELL AND FRIEDMAN AND DRS. FANSLER AND FRYKMAN

M. H. F. Friedman (Philadelphia, Pa.): First I should like to add a few remarks to our paper presented by Dr. Haskell. You may have noticed the development of costiveness upon continued treatment with intestinal extract. This has been experienced by about seven patients. The reason for this we do not know. It may be due to overdosage. It may be due to increased reabsorption of water, either as the direct result of the extract or consequent to the decrease in number and frequency of stools. Nearly all the patients have shown remarkable weight gains. We have also treated three patients with ileitis, with very favorable results. Each of the three has had some part of the ileum resected previously but unsuccessfully. Now they appear to be symptom-free while continuing with intestinal extract.

I am not a surgeon; I should therefore like to limit my remarks to some of the physiologic aspects of vagus nerve resection, particularly as they pertain to the interesting and cautious paper by Drs. Fansler and Frykman.

Recently the old procedure of vagotomy has been revived by Dragstedt and others for the surgical treatment of peptic ulcer. According to a survey made this year by the American Gastroenterological Association, since then approximately 9,000 patients with peptic ulcer have been subjected to bilateral vagus section for treatment of peptic ulcer.

Following vagotomy, gastric retention appears to be the immediate untoward effect of greatest importance. In man a barium meal may stay in the patient's stomach after vagus section for as long as five days. In our vagotomized dogs with a cannulated gastric fistula the opening of the fistula results in the release of an overpowering stench. The gastric contents have been stagnant and putrifying for days. In rats that we have vagotomized the stomach may become so dilated in two or three days as to be at least five times the normal size.

The gastric retention may be corrected by giving parasympathomimetic drugs like mecholyl or urocholine to hasten gastric evacuation. Nowadays most surgeons will not do vagotomy alone without combining it with some operation, such as gastroenterostomy or partial gastric resection, to offset the gastric retention. I would be very much interested to learn whether the patients that had been vagotomized for ulcerative colitis also show this marked delay in gastric evacuation.

The effects of vagotomy on the pancreas and gallbladder are noticeable although not marked. Pancreatic secretion in response to food has been found by Pincus and Thomas to be reduced by about 60 per cent. Snape, in our laboratory, has found that vagotomy also delays emptying of the gallbladder in response to food but does not abolish it entirely.

The observations made in Pavlov's laboratory have been most interesting. The Russian investi-

gators noted that one of the commonest results of complete vagotomy was the marked vulnerability of the bowel. Substances usually only mildly irritating to the intestinal mucosa would precipitate profuse hemorrhage and cause death if given after vagotomy.

In vagotomized dogs with intestinal fistulas we have seen repeatedly that light swabbing of the duodenal or jejunal mucosa results in profuse bleeding. Frequently we have seen bleeding even without any irritating stimulus. In dogs with experimental peptic ulcer Saltzstein reported that complete vagotomy resulted in jejunitis and ileitis in over 60 per cent of the experimental animals.

In our dogs bouts of diarrhea have been observed frequently. In peptic ulcer patients development of diarrhea has been a common after effect of vagotomy. These observations I find most interesting and pertinent in view of the vagotomy operation for relief of a disease giving these very symptoms.

In a recent paper Thomas and Komarov came to the conclusion that a truly complete removal of the vagus nerves is probably a rare occurrence and perhaps fortunately so. They believe that 100 per cent vagotomy is never beneficial but always detrimental to the organism, either man or animal. Evidence of regeneration of the vagus nerves has been obtained by many workers; however, these regenerated nerves are anatomic structures and no one has yet shown them to be functional. This is an interesting subject for future study.

If I may, I should like to make one more comment and one suggestion. We know from numerous studies that complete denervation of a visceral structure sensitizes that organ to the chemical substances that mediate the nerve impulse. Thus, sympathetic denervation of the heart makes it extremely sensitive to traces of adrenalin. This was described by Cannon and is usually referred to as the law of sensitization by denervation. The question I raise is this: Is complete vagotomy of the intestine desirable? Would not the operation sensitize the intestine to bring about the very parasympathetic effects that you think should be abolished? I should like to suggest this: Why not crush the vagus trunks or inject them with alcohol? The effects would not be permanent but probably endure long enough to bring about the bowel rest you seek and so perhaps interrupt a vicious cycle.

May I take this opportunity of digressing to see if I can obtain confirmation from you who have the experience of some observations which we have made? It is our impression that ileostomy with the colon in place results in discharge of liquid stools, so much so that the ileal stoma may become very bothersome. However, formed stools frequently occur from the ileal stoma if the colon has been removed. That has been our impression and I should like to have confirmation.

Finally, I should like to thank Dr. Fansler very much for his interesting paper. I think he will agree that this operation of vagotomy for ulcerative colitis is still, and should so be regarded for some time to come, an experimental procedure.

CLARENCE DENNIS (Minneapolis, Minn.): With regard to Dr. Fansler's comments concerning fecal fistulas complicating ileostomies, it has been my experience that this complication has not occurred in over sixty ileostomies. I believe that the reason for this is probably placement of the sutures in the wall of the bowel. They should be placed no deeper than the submucosa.

A review of the cases of idiopathic ulcerative colitis treated conservatively at the University of Minnesota Hospitals in the ten years ending January 1, 1944, showed a high hospital death rate (28 per cent). It is true that those transferred to a surgical program only after reaching a moribund state were classed as non-surgical cases. Those patients given surgical therapy in this period under elective indications or without drastic emergency numbered twenty-five and suffered an 8 per cent hospital mortality.

Studies of those treated conservatively and who survived showed more than one-half to be worse after dismissal than before admission. Of those dying under conservative therapy only two of sixteen died of causes not related to ulcerative colitis. Those survivors of non-surgical therapy who could be followed ten years after dismissal showed a mortality rate at the dismissal of more than 50 per cent.

As a result of this experience indications for surgical intervention were revised. All those with fulminating, all moderately severe and most mild cases of ulcerative colitis have since been considered candidates for surgical intervention. Since that time, I personally have seen fewer than five patients in whom surgery was not advised. It has been refused in only three cases; one of these patients is dead.

In the past two years our plan of surgical attack has been changed by the adoption of vagotomy in the therapy of this disease. The employment of division of the vagus nerves for colitis was imposed upon us in October, 1946 by a patient who developed active uncerative enteritis in the 6 feet of jejunum and ileum which remained after numerous resections of colon and ileum for ulcerative colitis and enteritis. The response was striking and led us to employ vagotomy as the sole surgical procedure in four patients with low grade colitis. They were observed for six months, at which time all four were asymptomatic and all four showed a healed mucosa on proctoscopic examination.

Since this finding, all patients coming to the University of Minnesota Hospitals and the Minneapolis General Hospital as candidates for surgery for idiopathic ulcerative colitis have been

subjected to vagotomy. Twenty-eight such procedures have been undertaken for colitis or enteritis and one for functional diarrhea of four years' duration.

Of the twenty-eight patients three are dead. One suffered cardiac arrest during surgical approach. One died ten weeks after vagotomy performed for a severe flare-up occurring six months after an ineffective ileostomy which had been done under desperate circumstances; she was found at autopsy to have multiple fistulas from the ileum to the sigmoid colon, thought to antedate the ileostomy. The third died several months after vagotomy from intestinal obstruction treated elsewhere; he had achieved improvement in his ulcerative proctitis. Our most striking case has already been related by Dr. Fansler.

Twenty-five patients with colitis have been followed two months or more and are thus available for evaluation. Sixteen have had vagotomy as the sole surgical procedure. Six of them are asymptomatic and four are improved. Five are listed as unimproved; one of them was seen by me and he should be listed as improved now. One patient is worse having suffered a severe flare-up three months later following a barium enema; emergency ileostomy was required.

Seven patients had ileostomies prior to vagotomy. Six of them are asymptomatic or improved. Twenty of our cases were universal in type and one-half of these presented ileac involvement, a point which did not seem to affect the outcome. Five were regional; three of the excellent results had a classical regional enteritis separated by normal ileum from the colon.

Roentgen evidence of improvement in the colon after vagotomy is the rule, but there has been only one case in which the appearance has entirely returned to normal. This patient is one of three who suffered an exacerbation after many months of improvement subsequent to vagotomy. The proctoscopic appearances have shown definite improvement within two weeks in a majority of the twenty patients still retaining rectums. Four patients with active disease have reverted to a normal appearance.

Certain studies have been prosecuted in an effort to gain an understanding of the mechanism of the effects observed. With our observation of striking improvement in the first cases, Lillehei, Dixon, Friesen and Wangensteen directed the experiments they had already been performing on the origin of colitis toward the possible rôle of autonomic innervation. They found, as Lium had, that prevertebral sympathetic ganglionectomy produces a usually fatal, purulent, bloody diarrhea in dogs. This effect does not follow if vagotomy is done at the same sitting.

That transit time of material through the stomach is prolonged after vagotomy is common knowledge. In each case an effort was made to determine the precise time of entry of barium into the duodenum and of exit from the terminal ileum. In eight cases it was possible to gather these data both before and after vagotomy. The mean preoperative transit time was three and one-half hours, that postoperatively was seven and one-half hours. In no instance did the passage fail to be slower after surgery.

Motility studies on the ileum were also employed using a long tube and a balloon and tambour. There seems to be a definite lessening of motor activity after vagotomy, but our data are still incomplete. Barium transit time through the colon was tripled after vagotomy, but determinations were difficult to establish precisely and were adequate in only three cases.

Wolf and Andrus have shown that the mucous membrane of the stomach becomes engorged on violent emotional reaction and that this reaction is blocked by division of the vagus nerves. In discussions with Dr. Cranston Holman of the Cornell Medical group the idea arose that this same change might be visible in the mucous membrane of the rectum. To determine this three patients were examined in the Sims position over a period of twenty minutes while discussions were carried on which were known to be emotionally disturbing to the patient. Violent emotional reaction resulted in two of the three patients in marked engorgement and in one, at least, superficial petechial hemorrhages developed under observation. In the third patient we could not find a subject which was disturbing. After vagotomy these changes did not occur. This evidence is, of course, too scanty for drawing definite conclusions, but it does suggest that the vagus perhaps indirectly has something to do with the mucosa of the rectum.

In answer to Dr. Friedman we have seen serious gastric retention only once; this patient required a gastro-enterostomy. Two other patients have had some postoperative gastric retention but this disappeared in a few weeks. Development of diarrhea after vagotomy has not been seen in our group nor has it been seen in about twenty-five patients in whom vagotomy has been done for duodenal ulcer. Finally, Dr. Friedman mentioned that he had seen the ileac discharge become more solid after removal of the colon in patients with ileostomies. We have not seen this occur in any instance.

In conclusion, the following statements should be emphasized: We have been unable to select those patients who will respond satisfactorily to vagotomy as failures and brilliant results have been seen in both early and late cases. It seems, upon reviewing our data, that marked rigidity portends a poor result; at least in this group a period of many months can be expected to pass before benefit will be seen. This is perhaps fortuitous for the cases of many years' standing are those in

which a cancer rate of approximately 14 per cent has been found.

Finally, it must be emphasized in particular that we are in no position to recommend that this type of therapy be generally adopted. It seems proper that vagotomy should not be done for ulcerative colitis unless it is done under well controlled circumstances in which the patient will be carefully studied and carefully followed. In other words, it should not be done except in an effort to evaluate the procedure. There is no basis as yet for recommending this procedure without qualification in ulcerative colitis.

THOMAS T. MACKIE (Winston Salem, N. C.): I am hesitant about my discussion partly because I am an internist and not a surgeon, partly because I have no experience whatever with the intestinal extract and partly because my experience with vagotomy has been limited to one unfortunate result, but one which to me is extremely illuminating.

I have a strong belief that many of the presentations dealing with the medical and surgical care of this disease appear to be at cross purposes because there is lack of a uniform basis for discussion. We must recognize that idiopathic ulcerative colitis is a cyclic and recurrent disease. We must recognize that the cycles of the disease, with regard to their duration, vary as between one patient and another and, further and even more unfortunately for purposes of clinical evaluation, they will vary decidedly with the same patient if one follows that individual as I have had the opportunity to do with many over considerable periods of years.

A further difficulty lies in the fact that we have no means of determining whether a particular therapeutic procedure is in effect responsible for the improvement that may occur; in other words, we cannot identify the spontaneous remissions which we know occur in the great majority of these cases.

It seems to me, therefore, that in any consideration of a new form of therapy we must have or attempt to have certain fundamental controls. Most important among these are evaluation of the factors which play primary or secondary rôles in the etiologic mechanism. This immediately raises the question as to what constitutes effective medical care. This question is particularly pertinent this morning because whenever we hear a presentation of the rôle of surgery in the treatment of this disease it is postulated by the surgeon that the patient has previously been subjected to competent medical investigation. Frequently, this is not the case. Competent study implies evaluation in the individual case, often over a prolonged period of time, of potentially important factors such as the rôle of primary and secondary infection, sensitization to foreign proteins and secondary disturbances of physiology. Evaluation of the physiologic changes that occur in the gastrointestinal tract are essential especially in severe cases. Hypochlorhydria or achlorhydria are not unusual and when present contribute to the severity of the disease. Disturbance of the motor physiology of the colon likewise is common producing what we have called a "constipated diarrhea." This is characterized by prolonged retention in the right half of the colon, frequent small evacuations commonly consisting principally of blood, mucus and pus and by increasingly severe spasm of the distal half of the colon. Subjective and objective improvement are promptly obtained by the judicious use of saline catharsis.

A further complicating factor is the frequent occurrence of sensitization of the colon to foreign protein of food and bacterial origin. Failure to recognize and to control this element in the mechanism may nullify any therapeutic approach and profoundly affect the prognosis.

Finally the numbers of cases presented, the conditions of the particular investigation and the duration of the periods of observation frequently are such as to render impossible statistical analysis of the observations and determination that the effects observed are not in fact the result of chance.

Dr. Haskell's paper presents an extraordinarily interesting hypothesis which could explain many of the puzzling features of the disease. The evidence at present, however, does not permit evaluation of the possibility that an intrinsic deficiency may be a factor in the pathogenesis. There are certain dubious features. An active principle in the intestinal extract has not been demonstrated. There is no method of assay other than the uncontrolled one of clinical trial. Finally the limited number of cases and the short follow-up period make it impossible to be entirely certain what the ultimate outcome will be in the treated individuals.

There are certain suggestive features. The apparent recurrence of symptoms and objective signs following withdrawal of the intestinal extract and the sequence of events observed in the healing process are those which I believe one would anticipate finding if a specific therapeutic agent were proving to be effective.

I should like to ask certain questions. Were consecutive or alternate cases used for evaluation of the intestinal extract? Were the cases grouped in terms of relatively comparable pathology? Were the patients receiving the extract aware of the fact that a new therapeutic agent was being used?

Dr. Fansler has given a most interesting presentation of experience with vagotomy. I am unconvinced about the ultimate value of this procedure with the possible exception of the acute fulminating cases which so frequently progress to an early fatal termination. The immediate and marked improvement occurring in the one acute case reported is perhaps an important observation because these are the cases frequently subjected

to ileostomy in the past and subject to a high mortality rate.

The rationale of vagotomy in ulcerative colitis is based upon control of motility and spasm of the colon. However, I have been unable to find anatomic or physiologic evidence to justify the assumption that section of the vagi will accomplish this end. In the only case which I have had the opportunity of following clinically vagotomy appeared to have little or no effect upon the spasm, and radiologically there was no demonstrable difference in the motility of the colon. Assuming, however, that motility and spasm may be reduced by vagotomy, the resulting disturbance of normal motor function might well create a physiologic change which we have found to occur as a definite complication of the disease. Dr. Dennis and the group in Minneapolis have encountered a surprisingly low incidence of gastric dilatation. This has not been the experience in other parts of the country and again I should fear the occurrence of this complication in the seriously ill patient.

The one case of vagotomy in ulcerative colitis that I have had the opportunity to follow illustrates the need for caution in resorting to this procedure and likewise the hazard of interpretation of results based upon a brief follow-up period. The patient, a young married woman with a severe form of the disease, had been in the hospital for something over a year. During this period she exhibited many of the devastating complications, including marked deficiency disease, pyoderma, multiple perianal fistulas and rectovaginal fistula. The history was suggestive of a probable food allergy. This could not be substantiated, however, by clinical study. Medical management did not yield satisfactory response and I considered her a suitable case of ileostomy followed by subtotal resection of the colon. However, it was decided to try vagotomy. Some three weeks later she was presented at a staff conference having improved to such a degree and having gained so much weight that I did not recognize her. Shortly thereafter she was discharged. Seven weeks ago she returned to the hospital in a very acute exacerbation after approximately five months of remission. The onset was acute occurring within thirty-six hours after taking a considerable amount of chocolate candy. During the previous admission we had suspected from the history a definite allergy to chocolate but had not been able to prove it conclusively. The subsequent course was progressively downhill ultimately terminating in fatality.

In this instance vagotomy was followed by a marked remission but conferred no protection against early and fatal relapse. The case further illustrates the fallacy of resort to palliative rather than definitive surgery before the individual pathogenic factors have been fully evaluated. This and many other experiences with the medical and surgical therapy of ulcerative colitis have forced me to certain definite conclusions. I am convinced that the surgeon and the internist interested in intestinal diseases could make important contributions to our philosophy of the management of this condition if, by some means, we could arrive at a standardized joint method of investigation and management prior to resorting to surgery.

I am in full accord with the concept that there are two groups of patients who should have immediate and radical surgery. They compromise those with the proximal type of the disease in whom the distal colon is uninvolved and those with the long-standing chronic type with a fibrotic colon wall, especially if pseudopolypoid degeneration is present.

I should like particularly to emphasize one of the fundamental problems of treatment. Surgical intervention, irrespective of the type of procedure, done in advance of completion of competent medical study permanently ties the hands of the internist. It becomes impossible to evaluate factors such as a possible allergy and in the case of palliative surgery, such as ileostomy followed by ileosigmoidostomy, it exposes the patient to the hazard of early postoperative acute relapse.

I am unwilling as yet to accept vagotomy as a suitable therapeutic procedure for ulcerative colitis, with the possible exception of the extremely acute fulminating case. I most heartily second Dr. Friedman's inquiry: why not profit by the long experience in the surgical treatment of pulmonary tuberculosis by phrenic crush? Why not attempt vagal crush rather than vagal section? This procedure would yield the same immediate physiologic changes and not leave us a patient with an irrevocable physiologic defect which of itself may be a serious hazard and at the best is still of uncertain permanent benefit. Apart from the questionable effect on the primary disease I question whether we yet know the ultimate effects of extirpation of the vagi.

GARNET W. GAULT (Washington, D. C.): Those of us who are especially interested in chronic ulcerative colitis are aware of the bizarre nature of this disease. Time does not permit a full discussion of the various factors that enter into the etiology of ulcerative colitis. Dr. Haskell has based the rationale for the use of extract of hog small intestinal mucosa on the premise that one of the etiologic agents is a deficiency of an intrinsic protective element which is normally present in the mucosa of the colon. This intrinsic protective element is supposed to inhibit self-digestion by proteolytic enzymatic activity. If the thesis is correct that there is a deficiency or an exhaustion of an antiproteolytic enzymatic element in the colon in cases of ulcerative colitis, then this work demonstrates that adequate dosage of extract of hog small intestinal mucosa supplies that anti-

proteolytic enzymatic element. I am sure we all wish that this assumption is the correct and complete answer to the problem at hand.

However, I would like to call your attention to other work vitally related to this problem. Documentary evidence is available that proteolytic enzymes are present in excess of normal in diarrheic stools. Tissue autolysis once started in an acid pH favoring proteolytic action can continue regardless of the pH variation in the tissues. There is evidence that the intestinal mucosa can be autolyzed by exogenous proteolytic enzymes elaborated by living putrefactive bacteria. It is, therefore, entirely probable that proteolytic enzymes, pH of the intestinal contents and mucosa itself and bacterial content of the colon are all interrelated.

Dr. Haskell has not had time to mention briefly that gastrointestinal hypermotility is to be considered in relation to the entire problem. If we concede that gastrointestinal hypermotility allows proteolytic enzymes to be more abundant and active in the colon than under normal conditions, then an additional element enters into the picture. Time does not permit a discussion of the reports of Mann, Kawamura, Cannon, Starling, Lium, Dragstedt and many others which indicate that intestinal hypermotility has something to do with this disease. Investigation of the neurogenic factors in relation to ulcerative colitis is being carried on and reported.

If Dr. Haskell and his associates have succeeded in counteracting this mucosal dissolution by substitution therapy in the form of extract of hog small intestinal mucosa, they have made an outstanding contribution to the treatment of chronic ulcerative colitis. Their discussion and tables indicate that extract of hog small intestinal mucosa should be of the greatest value in patients with early cases of ulcerative colitis who have not developed structural changes in the colon. It is to be noted in Table 1 of Dr. Haskell's paper that nineteen of twenty-three patients had this disease three years or less. The fact that in sixteen of twenty-three patients the disease was limited to the left colon and/or rectum is not inconsistent with the general location of the disease process. It is unfortunate that Dr. Haskell could not discuss several of these cases in detail. This study indicates that continued treatment without rest periods is to be carried out and that symptomatic improvement occurs before roentgen or proctoscopic evidence of improvement is available. I am reasonably sure that they did not expect to influence materially the status of the polypoid degeneration seen in two cases. If they can prevent dissolution of the mucosa which is the effective barrier against secondary infection by a variety of bowel organisms, they have accomplished a great deal.

On behalf of my surgical colleagues who wish that the problem of ulcerative colitis would always remain medical, I congratulate Dr. Haskell and his associates on their preliminary investigative report. I hope they will report the further results of this work before all of us a few years hence. If they can arrest the extreme colonic damage, prevent the development of surgical complications and rehabilitate these seriously ill patients, they have our deepest gratitude.

It is always a special pleasure to enter into a discussion of the surgical treatment of ulcerative colitis for one is frequently on controversial ground and a stimulating discussion can be anticipated. I find myself in agreement with Dr. Fansler in many respects but in dissecting his paper I must confess that some of the contents are not too clear. I am sure this is an oversight but they do merit discussion.

It is difficult to accept the statement, "In these cases, proctoscopic examination shows merely a red granular mucosa with no frank ulceration." Is it not true that a granular mucosa represents a phase in ulcerative colitis where a diffuse ulceration of the mucosa occurs so that little or no intact mucosal surface is seen due to diffuse 1 to 2 mm. ulcers. I assume that Dr. Fansler means that there are no large ulcers forming an irregular geographical pattern of mucosal denudation.

It is acknowledged by all concerned that the treatment of acute fulminating ulcerative colitis is indeed difficult. For the present I do not find myself in accord with the heroic views of those who advocate ileostomy for this phase of the disease. To date I am not aware of any published figures comparing the mortality rate and results in patients who have had ileostomy for acute fulminating ulcerative colitis and those who have had ileostomy for continuous and recurring chronic ulcerative colitis with disability or complications. Most of the surgeons and proctologists who have discussed or utilized ileostomy for acute fulminating ulcerative colitis have indicated that a prohibitive mortality varying from 25 to 50 per cent is to be anticipated. If this is correct, then the statement "as a general rule, the earlier these patients are operated upon the lower will be the overall mortality" will require factual support omitted in this paper. Furthermore, this quotation is inconsistent with "The most striking results have been in the acute fulminating type of the disease, and it is in this group that the highest operative mortality has been previously encountered." It is not difficult to understand the attitude of our medical colleagues who view ileostomy with disfavor under these circumstances. It is a pleasure to note that Dr. Fansler is hopeful that vagotomy will supplant ileostomy in this type of case.

Dr. Fansler has indicated that chronic recurrent or continuous ulcerative colitis with disability complications and a probable irreversible structural change in the colon may become surgical. The surgical treatment of ulcerative colitis is now on

safer, less controversial ground. It is true that the timing is most important for one does not want to wait, in the face of active progression or disabling recurrence, until one has a poor candidate for surgical rehabilitation. We have been satisfied with the following indications for surgery in this group: (1) chronic ulcerative colitis with constitutional and visceral degenerative changes; (2) anorectal complications; (3) polypoid degeneration and carcinoma; (4) obstruction and tumor mass; (5) perforation abscess and fistula; (6) segmental ulcerative colitis. Questionable indications for surgery have been considered as (1) hemorrhage; (2) acute fulminating ulcerative colitis; (3) acute perforation.

Dr. Fansler mentioned that anastomosis of the ileum to the diseased rectum had been done in one patient and that Dr. Wangensteen reported two similar cases. The rectum subsequently healed in two patients and remained unchanged in one patient. Inasmuch as this is not a common practice I hope he will discuss the rationale of this further for it is indeed a departure from accepted surgery. I am sure we are extremely interested in the reasons for doing this and the anticipated outcome over a long period of time.

There are many of us who are following the work of Dennis with interest. He has reported his results with vagotomy performed on twenty-three patients with ulcerative colitis, some of whom had regional enteritis. We are indebted to Dr. Fansler for bringing this to our attention again. This work represents an original effort to determine what type of patient will derive the most benefit from vagotomy. Preliminary reports indicate that those with early cases of chronic ulcerative colitis and the acute fulminating cases of ulcerative colitis will derive the most benefit from this procedure. I hope Dr. Fansler will continue to participate in this project and that vagotomy will be found useful for some phase of this disease.

BENJAMIN HASKELL (closing): We are at present working upon an animal assay method which I think promises a satisfactory method of determining the presence of an active principle. When the extracts were first used, we suspected that a lysozyme inhibitant was present, but subsequently we found no such inhibiting principle in the intestinal extract; as a matter of fact, some of the preparations have shown a small amount of lysozyme.

In answer to Dr. Mackie, these have been consecutive cases and no attempt has been made—at least I made no attempt—to group them into comparable types as far as pathology was concerned. We treated each patient as he came along and our results were not tabulated according to the type of case.

We were very much aware of the fact that the institution of some new form of therapy might have a beneficial psychic effect and for this reason made careful attempts to avoid having the patient know he was receiving some new form of therapy. He was aware of being given medication but did not know it was something new or experimental. I do not believe that many discussed the type of drug among themselves.

Protolytic enzymes were studied in a good many of these cases and we did not find an excessive amount of such enzymes present; as a matter of fact, we do not know how the intestinal extract works. Perhaps, as Dr. Gault has mentioned, we hope at some future meeting we may be able to tell you more.

POLYPOID LESIONS OF THE COLON AND RECTUM*

ROBERT A. SCARBOROUGH, M.D. AND RUSSELL R. KLEIN, M.D.
San Francisco, California

THE relationship of benign polyps of the colon and rectum to the development of carcinoma has been well established. Three important questions arise upon discovery of any polypoid lesion: (1) Is this a single lesion or is it a manifestation of a pathologic process which may also involve some other portion of the colon? (2) Is the lesion benign, premalignant or malignant? (3) What is the proper treatment?

The purpose of this paper is to present a discussion of these problems, based upon a review of our experience in a series of 458 patients in whom the original clinical investigation revealed presumably benign polypoid disease. This number represents an incidence of 4.6 per cent in 10,000 patients reviewed. Not included are the 531 patients who were treated for clinically evident carcinoma.

The following histologic types of polypoid lesions encountered, comprising only 5 per cent of cases, have been classified as not premalignant:

Fibroma. Two instances were encountered. In each case a single polyp of the rectum was present, one sessile, the other pedunculated, with normal appearing covering mucosa.

Myoma. There were three pedunculated polyps of this type, with normal overlying mucosa.

Endometrioma. Polypoid protrusion into the lumen of the rectum or sigmoid can occur in endometriosis and did so in two cases in this series.

Hemangioma. In one child twelve years of age roentgen-ray examination by barium and air contrast enema demonstrated a definite diffuse polyposis of the colon. Proctoscopic examination had revealed a single, dark red, sessile polyp. Laparotomy disclosed innumerable polypoid protrusions into the lumen of the bowel caused by multiple discreet hemangiomas. The entire small intestine was thickly studded with similar lesions.

Granuloma. Localized polypoid granulomatous lesions, from 3 to 8 cm. in diameter, covered with reddened, superficially eroded mucosa, occurred in seven patients. Four were amebic granulomas of the rectum; there was one tuberculous granuloma of the rectum. Two foreign body granulomas were encountered, one in the cecum overlying a heavy cotton ligature on an inverted appendical stump, the other in the rectosigmoid at the site of a tear and subsequent repair incident to a gynecologic operation.

Lymphoid Polyps. These may occur singly or as innumerable firm, sessile elevations of the mucosa as the result of submucosal lymph follicle hyperplasia, probably secondary to infection. In our experience this condition appears to bear no relationship to the development of malignancy. This is contrary to the belief that such aggregations of lymphoid tissue may create changes in the overlying epithelium, with eventual formation of adenomatous polyps and ultimate malignant degeneration. In rare instances polyposis of the colon may be due to such lymphoid polyps. This may have been true in the very few reported cases of cure by roentgen-ray therapy.

Lymphoma. (Giant follicle lymphoid tumor.) Six examples of this type of tumor have been encountered. In each instance a single lesion in the rectal ampulla was palpable as a firm, smoothly rounded, partially pedunculated tumor 2 to 3 cm. in diameter. The covering mucosa appeared reddened and tense. Microscopic examination showed multiple lobules of extraordinarily hyperplastic lymphoid tissue, with very large, distinct follicles and huge secondary centers with numerous mitoses. In all cases local excision has been followed by no evidence of recurrence.

The following types, comprising 95 per cent of cases, have been classified as premalignant:

Inflammatory Hyperplasia. This type of polyp is typically exemplified in the so-called pseudopolyposis which occurs in chronic ulcerative colitis. Such polyps may be found in patients who show no evidence of active ulcerative disease, but the irregularity of con-

* From the Department of Surgery, Stanford University Medical School.

tour and the reddened covering mucosa is usually suggestive of this type of lesion. Microscopic examination shows a marked hyperplasia of the mucosa, with frequent variation in the staining characteristics of the cells and an associated submucosal inflammation. Malignant degeneration is sufficiently common to warrant classification as a definite precancerous lesion.

Hyperplasia. These lesions are usually seen as multiple, pale, flattened elevations a few mm. in diameter in elderly people. Vernon David has compared these to hyperplasia occurring on a senile basis in other parts of the body such as the skin. They are frequently found within a few cm. of a carcinoma. Whether the carcinoma arose in such a lesion or whether they are the result of reaction to infection and irritation secondary to carcinoma is not at all certain. Such lesions, however, have occurred in this series in individuals who had no carcinoma present. Microscopic examination shows a simple hyperplasia, with enlarged glandular structures, normal staining properties of the epithelium and complete absence of any submucosal inflammation.

Adenoma. This is by far the most common type of polypoid lesion in all age groups. In size adenomas may vary from tiny sessile lesions to large pedunculated tumors several cm. in diameter. In color they may be similar to the adjacent normal mucosa or may range from light pink to deep red. Ulceration may or may not be present. Single, several or hundreds of such polyps may occur. The microscopic appearance varies from simple adenomatous hyperplasia to more and more irregular structural formation, with variation in the staining properties of the cells and variable frequency of mitotic figures. The microscopic appearance changes almost insensibly to that of a definite malignant tumor. Recognition of actual malignancy is of the utmost importance in determination of proper treatment and is dependent upon examination by a competent surgical pathologist. Some pathologists diagnose any adenomatous polyp as adenocarcinoma grade 1. Some diagnose malignancy on the basis of variation in the staining properties of the cells, ballooning of the crypts or frequency of mitotic figures. Such diagnoses may lead to unnecessary radical operations or a false sense of security in the safety of local excision. The basic evidence of malignancy is invasion through the basement membrane or muscularis mucosa. When this has been demonstrated, the lesion should be called carcinoma and be treated as such. In the absence of any microscopic evidence of invasion complete local excision or destruction of the tumor is adequate and satisfactory treatment.

Papillary Adenoma. This is a distinctive type of adenomatous polyp, commonly considered a rare and relatively innocuous tumor susceptible to low grade malignant degeneration. Our experience does not support this concept. In this series there were sixty patients with papillary adenomatous lesions. Although many of these were benign, others were the site of origin of carcinoma which invaded adjacent organs and metastasized by lymphatic and vascular channels.

These distinctive tumors are extremely soft and spongy, being comprised of innumerable confluent, pliable, papillary stalks. They are rarely pedunculated, usually having a broad based attachment to the mucous membrane. Their diameter varies from a few mm. to many cm., sometimes with involvement of the entire circumference of the bowel for a considerable distance.

Microscopic examination reveals a connective tissue stroma which branches and rebranches. The covering epithelium is composed of columnar cells in single or multiple layers with many goblet cells. Variable hyperchromatosis and frequent mitoses are common but are not pathognomonic of malignancy. Irregularity in gland differentiation or ballooning at the depths of the crypts is highly suggestive of malignancy but not diagnostic in itself. The basic microscopic evidence of malignancy is invasion through the basement membrane or muscularis mucosa.

Determination of the presence of malignancy in a papillary adenoma is often difficult. Such degeneration quite characteristically begins deep in the base of the lesion with no surface evidence of malignancy either by palpation, visual inspection or superficial biopsy examination.

Malignant degeneration was found in eighteen of sixty patients, or 30 per cent. In only eight of the eighteen was it possible to demonstrate this by multiple biopsies. In the other ten patients the presence of malignancy was determined in four instances only after complete local removal of the tumor and subsequent

pathologic examination. In six patients a presumptive diagnosis of malignancy was made solely upon the basis of palpation of areas of induration within an otherwise soft, spongy tumor. These six patients were subjected to radical resection and in every instance the presence of definite invasive carcinoma was confirmed by microscopic examination.

Two of the eighteen carcinomas were found inoperable at laparotomy because of liver metastases and direct invasion of the tumor into adjacent organs. Fourteen patients were treated by radical resection. In two instances regional lymph node metastases had already occurred. Three patients, without evidence of glandular metastases, subsequently developed distal metastases to the liver, lung and spine.

We believe that every presumably benign papillary adenoma should be completely excised or removed by diathermy snare, and all of the tumor should be carefully studied by a competent pathologist for evidence of malignant degeneration. If this is present, radical resection is indicated.

STATISTICAL DATA IN 458 PATIENTS

In this series the incidence of polyps in males was 10 per cent greater than in females. The age of the patients ranged from five days to ninety-four years. The incidence by decades is shown in Table 1. The infrequency of diagnosis of polypoid disease in the second decade of life is striking. This would suggest that perhaps there is a hormonal factor of embryonic life that is responsible for the relative frequency of polyps in the very young, and that the increasing incidence of polypoid disease in later decades is due to some stimulus, physical, chemical or inflammatory, originating in the individual. There is also undoubtedly a factor of hereditary predisposition as exemplified in familial diffuse polyposis. However, in the majority of cases of polypoid disease we have not been impressed by the importance of hereditary predisposition.

In this series 64 per cent of the patients were found to have a single polyp; 31 per cent had from two to ten polyps and 5 per cent had diffuse polyposis of the colon.

The diagnosis of a single polyp has been accepted only after thorough investigation by barium and air contrast enema examination following proctoscopy. In every patient in whom any adenomatous polyp is found by proctoscopy, regardless of symptoms, careful roentgen-ray examination is carried out in search of other polypoid lesions higher in the colon. A considerable number of patients in whom a benign polyp was found by proctoscopy are not included in this series because subsequent roentgen-ray examination demonstrated the presence of a carcinoma higher up. It is almost certainly true that there have been included, under the category of single polyps, patients who actually have had other polyps which were not demonstrable. Because of this possibility and because of the possibility of subsequent development of other polyps, each patient at the completion of treatment is advised to have a yearly proctoscopic examination and to report promptly any bleeding or change in bowel habits.

TABLE 1

AGE INCIDENCE BY DECADES IN 458 PATIENTS

Decade	Per Cent
1	10
2	1
3	10
4	12
5	24
6	22
7	21

ROENTGEN-RAY DIAGNOSIS

The problems of diagnosis by roentgen-ray examination of polypoid lesions beyond reach of a proctoscope deserve comment. Regardless of the technical skill employed barium enema examination has a diagnostic accuracy of about 90 per cent in well advanced carcinoma of the colon. In demonstration of benign polyps this diagnostic accuracy is greatly reduced even with the valuable adjunct of air contrast examination. Frequently two or more examinations are necessary before it is possible to demonstrate the lesion responsible for the presence of gross blood in the stool.

The presence of gross blood in the stool is frequently attributed to diverticulitis of the colon. Demonstration of diverticula by barium enema is commonly considered adequate evidence for this conclusion when sigmoidoscopic and roentgen ray examination have not disclosed the presence of ulcerative disease or carcinoma. Bleeding can occur in diverticulitis, but in our experience such bleeding

usually has been found to be due to a coexisting adenomatous neoplasm.

During the past two years we have removed polypoid tumors of the colon in sixteen patients who had had a previous diagnosis of diverticulitis as the explanation of rectal bleeding. After operation there was no further bleeding in any of these patients although the diverticular disease was still present.

In eleven cases a single benign adenomatous polyp was removed by colotomy or through a proctoscope. In one patient a grossly benign, pedunculated polyp in the sigmoid was locally excised, and subsequent microscopic examination revealed a small area of malignant degeneration in an otherwise benign adenoma. In the remaining four cases obvious malignant degeneration was found at laparotomy necessitating radical resection.

Differential diagnosis is largely dependent upon roentgen-ray examination of the colon. The presence of diverticula, and particularly the presence of distortions resulting from diverticulitis, greatly increase the difficulty of demonstration of polypoid lesions. This is sometimes impossible even with repeated examinations and use of the air contrast technic. In such instances the continued evidence of blood coming from above the reach of a proctoscope is sufficient indication for exploratory laparotomy and thorough search for a probable polypoid tumor.

TREATMENT

Proper treatment is dependent upon accurate determination of the presence or absence of malignancy. By gross appearance a polyp may be presumed to be benign, but final diagnosis requires careful microscopic examination by a competent surgical pathologist. For this reason it is always desirable to remove the polyp in its entirety in a suitable state of preservation for satisfactory microscopic examination. Tiny sessile lesions may be destroyed by a ball-tipped diathermy electrode. This precludes microscopic examination, however, and occasionally may result in failure to recognize an early carcinoma. We have recently seen a poorly differentiated invasive carcinoma in a non-ulcerated sessile polyp 4 mm. in diameter. Small sessile polyps may be removed with a rigid wire diathermy loop in suitable condition for microscopic examination. Pedunculated tumors are usually best removed by amputation through the pedicle with a diathermy snare. In this series, excluding cases of diffuse polyposis, 211 polyps in 112 patients were destroyed by electrodesiccation through a proctoscope. Three hundred twenty-six polyps in 182 patients were removed by diathermy snare and examined microscopically. Thirteen of these, or 4 per cent of polyps in 7 per cent of the patients, were found by microscopic examination to have undergone definite malignant degeneration. Of these thirteen, nine were submitted to radical resection and in three, or 33 per cent, residual carcinoma was demonstrated in the perirectal tissue or regional lymph nodes. In four patients local excision of adenomatous polyps with small areas of malignant degeneration and long pedicles has been carried out. In one of these local recurrence of carcinoma was evident after eight months. The other three have shown no evidence of recurrence or metastases in less than two years, but the gamble has not yet been conclusively won.

POLYPS ABOVE REACH OF A PROCTOSCOPE

Single, grossly benign polyps have been removed by colotomy in thirty-seven patients. Twelve of these thirty-seven polyps, or one in three, showed definite malignant degeneration on microscopic examination. In six of the twelve patients with a malignant polyp only local excision was done. In each instance only a small area of malignancy was present in an otherwise benign, adenomatous, pedunculated polyp. There has been no evidence of recurrence of carcinoma in these patients a few months to several years after operation. In the other six patients with a malignant polyp radical segmental resection with removal of the regional lymph nodes was immediately carried out. In two cases the decision to perform radical resection was influenced by the fact that microscopic examination revealed malignant degeneration in a major portion of the body of the polyp. In all six patients subjected to radical resection no invasion of the pedicle could be found, but three of the six had metastic carcinoma in the regional lymph nodes. All six patients have remained well for one to eight years.

In addition to the thirty-six patients operated upon for a single polyp four patients were explored for two separate polyps situated from 4 to 12 inches apart. In one patient both polyps were benign and were removed locally by

colotomy. In the other three patients both polyps were malignant and radical resection of the portion of the colon including both lesions was carried out. In one of the three patients metastases had occurred to the regional lymph nodes.

It is evident from these statistics that we have not been able to establish any clear criteria for determination of the necessity for radical resection in such cases. We have been fortunate to date in having elected to perform a radical resection in three patients who otherwise now would be dead from their carcinoma. The individual judgement of a surgeon cannot be infallible in determining whether malignant cells have or have not already extended beyond the local confines of a pedunculated tumor. When local excision only is selected, it must be considered to be a carefully calculated risk rather than the procedure which offers the greatest possible opportunity for cure to every patient. Although the odds may seem good, it must never be forgotten that the gamble is with the life of the patient.

POLYPOSIS OF THE COLON

Thirty-one patients in this series had diffuse polyposis of the colon. These may be divided into two groups: those with diffuse adenomatous polyps, with or without a familial history of disease, and those with pseudopolyposis secondary to chronic ulcerative colitis.

There were sixteen patients with diffuse adenomatous polyposis. None of these patients presented evidence of existing ulcerative disease or gave a history of previous acute or chronic colitis. Six of these patients were from three to six years of age. In two of these children colectomy was performed with anastomosis of the ileum to the rectum. This has been recommended but not yet accepted by the parents of the other four children. Ten patients were from eighteen to fifty-one years of age. Seven of the ten, comprising 70 per cent adults, already had malignant degeneration present and five of them had multiple carcinomas. Of the ten adult patients seven were treated by complete colectomy with permanent ileostomy. In two patients, with no carcinoma in the rectum, colectomy and anastomosis of the ileum to the rectum was performed after removal or destruction of all polyps in the rectum. One of these patients has required frequent electrodesiccation of new polyps in the rectum for more than ten years. One of the seven patients with carcinoma died of recurrent malignancy. The other six are alive with no evidence of recurrence after one to fifteen years.

There were fifteen patients with pseudopolyposis secondary to chronic ulcerative colitis. Four of these patients, or 27 per cent, had carcinoma. Three of the four had inoperable carcinoma. Complete colectomy with permanent ileostomy was carried out in four patients. In one patient with chronic ulcerative colitis and pseudopolyposis involving the colon from the splenic flexure to the rectum, resection of the involved bowel was done and the transverse colon pulled through the anal canal according to the technic of Babcock and Bacon.

CONCLUSIONS

1. The majority of polypoid lesions of the colon and rectum are premalignant. Their discovery and eradication will prevent carcinoma in many instances.

2. Polyps are asymptomatic until ulceration results in bleeding or symptoms occur from mechanical interference with bowel motility.

3. The discovery of a polyp by sigmoidoscopic examination or the occurrence of unexplained rectal bleeding is an indication for barium and air contrast roentgen-ray studies of the colon.

4. The determination of malignant degeneration in a polyp frequently is impossible by clinical signs. Competent pathologic examination of the entire lesion is desirable for accurate diagnosis. Local excision or fulguration of a pedunculated malignant polyp does not offer the greatest possible opportunity for cure.

5. Removal of a polyp or resection of a carcinoma does not conclude the responsibility of the surgeon. Periodic sigmoidoscopic examination should be done, and roentgen-ray studies should be made whenever signs or symptoms develop which suggest the possibility of a new lesion.

RÔLE OF THE PATHOLOGIST IN THE DIAGNOSIS OF POLYPOID LESIONS OF THE COLON AND RECTUM

FERDINAND C. HELWIG, M.D.
Kansas City, Missouri

THE pathologist, like other medical specialists, is frequently confronted with new diagnostic refinements, some of them

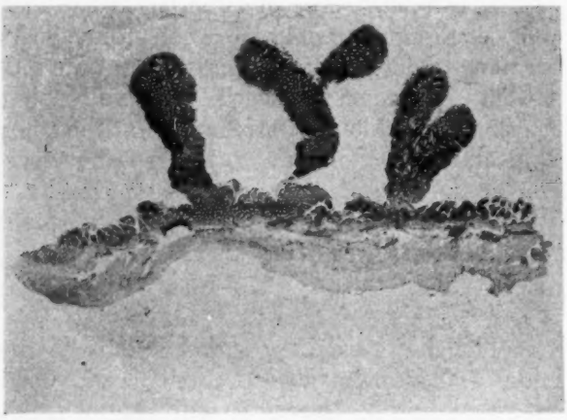


FIG. 1. True branching polypi superimposed on chronic ulcerous colitis.

quite valuable. This is particularly true in the always puzzling so-called border-line neoplastic processes. Epitheliomas of the lip, mouth, larynx and cervix, carcinoma of the thyroid, bronchus, breast, stomach and corpus uteri, all within quite recent times have been subjected to re-study and re-evaluation. Even the early skin melanomas are being actively re-investigated for hitherto perhaps neglected but possibly important early morphologic alterations of clinical significance. In fact, recent work has been done or is under way on a surprisingly long list of histologically debatable tumors.

The increasing application of the Papanicolaou stain for nuclear variants has also served to stimulate careful study for early changes in fixed material in conjunction with these smear preparations.

Needless to say, in these re-evaluations the border-line epithelial growths of the colon and rectum have not been neglected. This study often has been forced upon us by proctologists who, in recent years particularly, are not just skilfull operators but also good practical surgical pathologists. It is to these gentlemen that we often are obligated for a more careful analysis and follow-up of this by no means insignificant group of epithelial tumors which I like to designate as the histologically malignant but clinically benign group.

Unfortunately, even today too many of these lesions of the colon and rectum which show one or more foci of morphologic atypia are given the simple caption of carcinoma and the unlucky patient is subjected to unnecessary radical surgery.

ETIOLOGY

Much has been written on the possible causative factors of colonic polypi. One school has suggested that they arise on a chronic inflammatory basis: pinworms, flukes, tuberculosis, bacillary and amebic dysentery, idiopathic ulcerous colitis, foods containing carcinogenic hydrocarbons and subclinical inflammation of submucous lymphoid follicles have all been implicated. The other school thinks that the polypi are true tumors, probably arising *de novo* from the mucosa of the bowel. It is quite true that in the chronic ulcerous lesions of the bowel the papillomatous lesions are rarely true neoplasms but are merely inflammatory polypoid projections of otherwise normal mucosa. (Fig. 1.) It would seem that in most instances the occurrence of polyps or carcinoma in such an ulcerated gut was purely fortuitous and the same possibly holds true for the association of cancer of the bowel and diverticulosis or diverticulitis which are such common lesions in the cancer age. In my own material I have been able to demonstrate changes in the gut wall in multiple colonic polyposis in some instances which I think are consistent with the first theory although I must confess that this has been rarely possible. There is, however, no good reason that I know of which would render a colon, already the seat of multiply polypi, immune to chronic ulcerous colitis. Ewing[5] found in the early stages of congenital polyposis pronounced hypertrophy of the entire lining

of the colon, and he thinks this finding supports the view that the sole element in the predisposition is the excessive reaction of the gut epithelium to irritants. It has also been Ewing's observation that many cases preserve their inflammatory character throughout although still showing a marked tendency toward the development of malignant adenomas and carcinoma. However, it appears unlikely that such lesions as idiopathic colitis or amebiasis of long-standing would involute so completely that no histologic trace would remain in those colons with multiple polypi.

Many experiments[1] employing the feeding of carcinogenic hydrocarbons have failed to produce tumors of the alimentary tract. Moreover, those instances in which apparent success was obtained were not very convincing. This would seem only logical since the period of contact of any given carcinogenic agent with any single area of the gut mucosa is too brief and the agent likewise would be diluted with food. Furthermore, the protective action of mucus would also be a deterring factor to the carcinogenic agent. Bargen, Cromar and Dixon[2] have entertained an interesting hypothesis suggesting that the site of adenoma formation is determined by the location of submucous lymphoid follicles. (Fig. 2.) These authors think that these submucous follicles, when subjected to subclinical inflammatory hyperplasia, may rupture into the bowel lumen forming a tiny ulcer. In the process of healing, epithelial cells become trapped in the base of the ulcer. Sometimes a small island of epithelium becomes isolated by a circle of lymphoid follicles which, due to progressive enlargement, have destroyed the muscularis mucosa and the epithelium becomes "pegged down" to the underlying submucosa by the lymph follicles. "Contraction of the surrounding muscularis tends to approximate these fixed points by centripetal compression and the tissue which they enclosed subsequently becomes pushed up as a little elevation above the surface of the mucosa." This little bud, they believe, represents the earliest stage in the formation of an adenoma.

In my own material I have been unable to confirm these observations, and extensive studies made by Helwig,[3] of St. Louis, on a large quantity of material would appear to contradict such a hypothesis. He believes that lymph nodules in the neighborhood of polypi

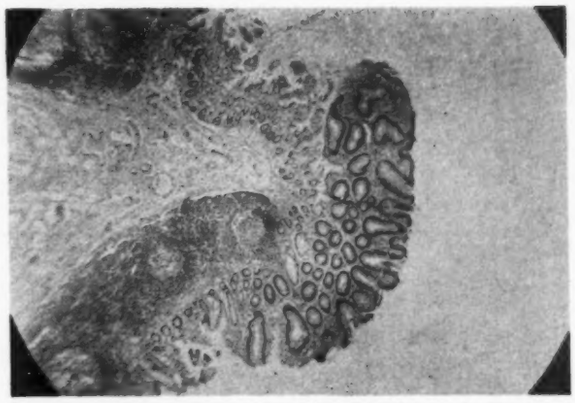


FIG. 2. Low power photomicrograph; early benign polyp showing lymph follicles and beginning formation of pedicle.

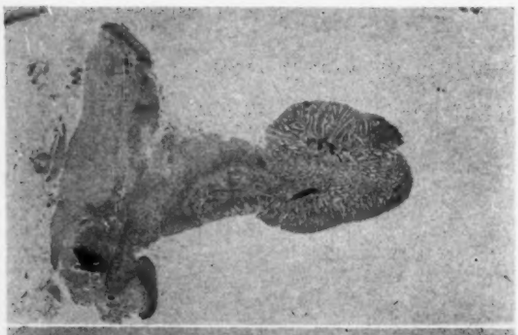
are purely coincidental and undergo hyperplasia as a result of inflammatory changes in the polyp. He argues that lymph nodules should be present in all polyps and that the polyps do not follow hyperplasias in other organs, such as the appendix and small intestine. He found adenomas uncommon in the negro and states that there is no evidence the negro has fewer follicles than the white man. He observed no constant location of lymph nodules in relation to areas of epithelial hyperplasia which we think represent the early stage of adenoma formation. Lastly, he mentions that lymph nodules are not uncommonly seen abutting upon lipomas and carcinoids where they could not be considered of etiologic significance.

In a more recent communication by Atwater and Bargen[4] the latter author has abandoned the lymph nodule theory at least partially. They studied 166 colons from necropsy material which presented polypi and found only 70 per cent of the sections taken from these polypi showing lymph nodules whereas 90 per cent of pure control sections showed them. They conclude that "lymphoid structures at most seem to play only a casual rôle in the pathogenesis of intestinal polyps." Dixon, however, in a personal communication, continues to hold the lymph nodule hypothesis.

CLASSIFICATION AND PATHOLOGY

Binkley and Sunderland[6] proposed a simple yet quite adequate classification of the epithelial overgrowths of the colon and rectum which should satisfy both proctologist and pathologist. They classified them into three groups as follows: areas of mucosal hyperplasia, adenomas and papillary adenomas.

3



4

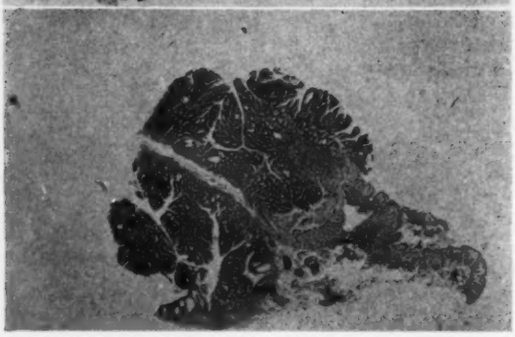


FIG. 3. Low power photomicrograph; small benign polyp with long pedicle.
FIG. 4. Low power photomicrograph; benign polyp showing arborization and basophilia.

The simple hyperplasias, as Dukes has shown, commonly are observed adjacent to infiltrating carcinomas. They are likewise encountered on the mucosal surface of colostomies and in other areas subject to chronic irritation.

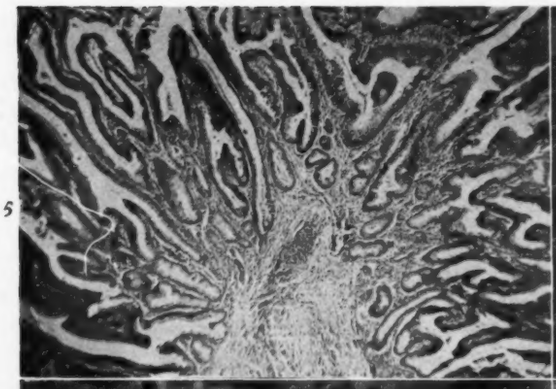
When polypi and foci of hyperplasia are present in the same bowel, it is sometimes possible to trace successive steps in the development of an adenoma. Following hyperplasia, the first step seems to be that of pulling out of the muscularis mucosa into a little hillock which carries muscularis mucosa, submucous stroma and vascular apparatus out with it, forming a small sessile protuberance easily visible grossly. (Fig. 2.) As the tumor increases in size there is more and more tendency to form a pedicle. As the pedicle elongates it usually is covered with normal or slightly hypertrophied mucosa. (Fig. 3.) The tumor itself continues to arborize and eventually may reach 3 or more cm. in diameter. As a rule, however, the tumors are relatively small and often even some of the small ones, while appearing sessile, will upon removal reveal a pedicle hidden by the overhanging borders of the adenoma. (Fig. 4.)

Grossly, adenomas are usually round, oblong or flattened, and the surface may be even or lobulated. Different tumors in the same bowel often show a wide range of sizes and shapes. The larger growths are more apt to be lobulated. The tumors vary in color from pale gray to red depending on their vascularity, and the larger growths are more often hyperemic. When ulcerated or indurated, carcinomatous transformation should be strongly suspected. If induration is palpable at the periphery of the growth, however, it may not be clinically significant. On the other hand, when the base is indurated, malignant invasion is usually present.

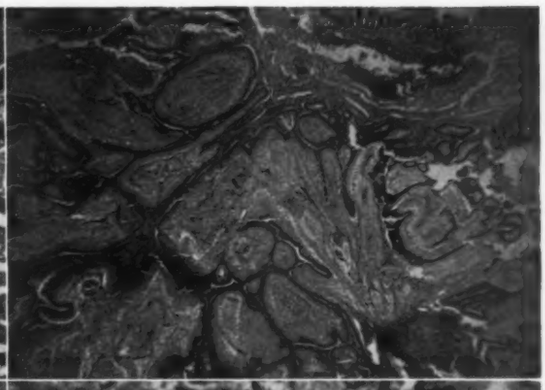
Histologic variants are usually absent or minor in the very small tumors. With increasing size, changes in cell type begin to appear, the earliest being an increase in size of the crypts of Lieberkuhn, and the glands tend to become more elongated. In some very small tumors, however, cellular basophilism may be observed in tiny patches. As the tumor grows larger, the epithelial cells lining the glands may often show a cuboid shape and varying degrees of increased mucus production may also be encountered. Instead of being basally located, the nuclei tend to migrate to the center of the cell and often become more elongated. (Figs. 5, 6 and 7.)

As the arborization of the polyp becomes increasingly complex further nuclear changes begin to appear, consisting of stratification, increased vesicularity or basophilism, atypical nuclear forms and mitoses. (Figs. 8 and 9.) Atypical secondary gland formations may also be observed. In some areas we may encounter breaking through of the basement membrane and see cells passing into the underlying stroma. Many of the above changes speak for histologic malignancy. Nevertheless, when the base is not invaded and the pedicle is narrow, we are ordinarily dealing with a clinically benign lesion. However, when in addition to the signs of cellular atypia and breaking of the basement membrane, infiltration of the muscularis mucosa, penetration of lymphatic or vascular channels, or invasion of the gut wall is found, clinical carcinoma has supervened. (Fig. 10.) Varying degrees of acute, subacute and chronic inflammation and edema are quite often seen and this is much more likely to be present to an increasing degree as the tumor increases in size, and is usually much more striking when a focus of ulceration is present.

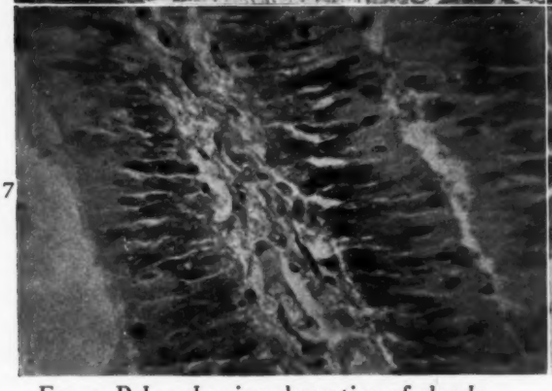
The third and least frequent type of the polyps is the papillary adenoma. These tumors may cover a wide surface. I have seen the en-



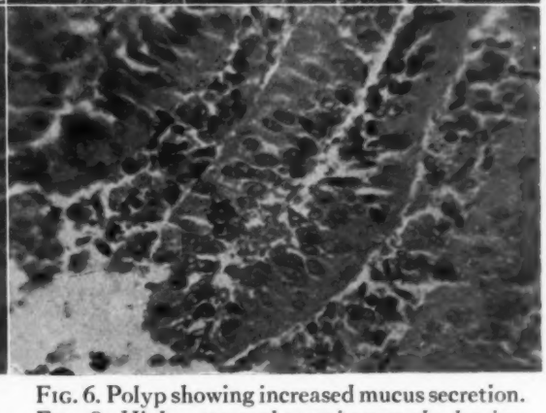
5



6



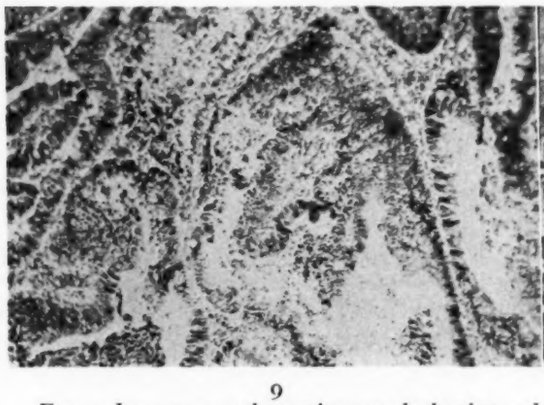
7



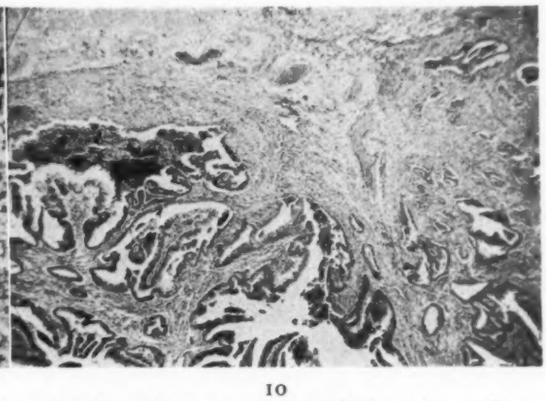
8

FIG. 5. Polyp showing elongation of glands.
FIG. 7. High power photomicrograph of benign polyp showing changes in nuclear form and structure.

FIG. 6. Polyp showing increased mucus secretion.
FIG. 8. High power photomicrograph; benign polyp showing changes in cell type.



9



10

FIG. 9. Low power photomicrograph; benign polyp showing piling up and irregularity of growth.
FIG. 10. Low power photomicrograph; polyp showing early malignant invasion.

tire mucosa of the rectal ampulla covered with the growth which resembled a carpet with a very long nap. The tumors may range in size from miniature growths up to those covering a very large area. When a pedicle is present, it is usually as wide as the overgrowth. When the tumor covers a zone of mucosa of medium or large dimensions, there may be a considerable variation in the thickness of the growth in different areas. Some may be as much as 3 or 4 cm. thick. The base of the growth may be semi-rounded or quite irregular. The growth on palpation is usually very soft and, as Binkley says, may not be felt with the examining finger. In contrast to the adenomas which are usually pedunculated and in which carcinoma usually arises at the border of the growth, the papillary adenomas may show early malignant changes at the base of the growth and frequently near the center of the

tumor. Invasion into the wall of the gut, the lymphatics or vascular channels may take place early. Furthermore, the zone of malignancy may not be visualized readily. Hence, this is a much more treacherous tumor and fortunately is uncommon. When these tumors are fixed, ulcerated or indurated, cancer is present in almost all instances.

Microscopically, we find the growth to be made up of many individual branching outgrowths, each carrying its own blood supply. These delicate villous processes may show any or all of the histologic variants that were mentioned under the adenomas. Even in the soft, non-ulcerated, movable tumors many of these microscopic variants may be observed at times. Hence, unless a considerable degree of anaplasia and architectural distortion exists, we must depend upon invasion as a criterion of true clinical malignancy. However, when such histologic changes do exist, induration, fixation or ulceration are almost always present although difficult at times to determine in the larger growths.

SUMMARY AND CONCLUSIONS

Simple hyperplasia is the first step in adenoma formation. This hyperplasia in most instances seems to arise *de novo* from normal appearing mucosa without the intervention of any demonstrable etiologic agent. In some instances, quite rare in my experience, true neoplastic polypi seem to result from long standing chronic inflammation of the gut wall. No other known etiologic factor has been convincingly demonstrated.

Adenomas with a narrow pedicle are usually clinically benign; although as they increase in size, they demonstrate an increasing tendency to show a wide range of microscopic variants which would ordinarily be captioned carcinoma on a histologic basis. When the base is involved, we have another story. Therefore, the pathologist should be furnished with the whole tumor including the base or at least a piece of the base as well as the periphery, along with a thorough description of the gross appearance of the tumor. In the absence of these necessary requisites the pathologist has no choice in the face of histologic malignancy other than to render a diagnosis of cancer. Ulceration and/or induration of the base of the polyp usually means clinical carcinoma. This information should also be imparted to the pathologist.

Papillomas are broad based and are usually soft. They may be missed with the examining finger. They tend to cover rather wide areas of mucosa at times and as they increase in size they may exhibit the same cellular variants observed in the adenomas. Unlike the adenomas they are more apt to undergo invasive malignancy at the base. When the tumor is relatively large, foci of fixation, ulceration and induration may be overlooked. Thus, these tumors are more treacherous than the adenomas. Such indurated and ulcerated areas at the base must be biopsied or clinical carcinoma may be missed.

REFERENCES

1. Peacock and Kirby, Cook and Kennaway. Quoted by Willis, R. A. Pathology of Tumors. Pp. 61–62, St. Louis, 1948. C. V. Mosby Co.
2. Bargen, J. A., Cromar, C. D. L. and Dixon, C. F. Early carcinoma of colon; nature and adequate treatment of small carcinomas. *Arch. Surg.*, 43: 186, 1941.
3. Helwig, E. B. Evolution of adenomas of large intestine and their relation to carcinoma. *Surg., Gynec. & Obst.*, 84: 36, 1947.
4. Atwater, J. S. and Bargen, J. A. Pathogenesis of intestinal polyps. *Gastroenterology*, 4: 395, 1945.
5. Ewing, James. Neoplastic Diseases. P. 734. Philadelphia, 1942. W. B. Saunders.
6. Binkley, G. E. and Sunderland, D. A. Diagnosis and treatment of papillary adenomas of the rectum. *Am. J. Surg.*, 75: 365, 1948.

SURGICAL TREATMENT OF POLYPS OF THE LARGE INTESTINE*

RICHARD B. CATTELL, M.D.
Boston, Massachusetts

THE discovery and treatment of intestinal polyps while still in a benign or premalignant state is of the utmost importance. The destruction of polyps in the lower segments by fulguration or their removal from the proximal segments by laparotomy permits local removal usually without the necessity for removal of large segments of the intestine which becomes necessary when malignant degeneration has occurred. Careful study of adults during a routine physical examination, which includes sigmoidoscopic examination and roentgenographic studies of the colon, will result in the discovery of an increasing number of these benign lesions. Major attention has been focused properly upon the detection of carcinoma of the colon and rectum in as early a stage as possible since adequate resection offers an excellent chance for cure in this stage of malignancy.

In spite of the fact that malignant lesions are being resected at a somewhat earlier time, which in our experience is approximately a two months shorter duration than ten years before and in spite of improvements in operative procedures for removal of the malignancy and reduction in operative mortality, the results observed five years or more after resection have not appreciably improved and remain in the vicinity of 50 per cent five-year survivals. The greatest opportunity in the future for the improvement of results lies in the discovery and treatment of the premalignant lesion of the colon and rectum, the benign polyp. It is encouraging to see the increased emphasis being placed on the importance of the benign intestinal polyp and it is fitting that the American Proctologic Society presents the problem further in this symposium of three papers. The previous speakers have emphasized the incidence, diagnosis as well as the pathology of these tumors and this paper will be primarily concerned with the surgical treatment of polyps.

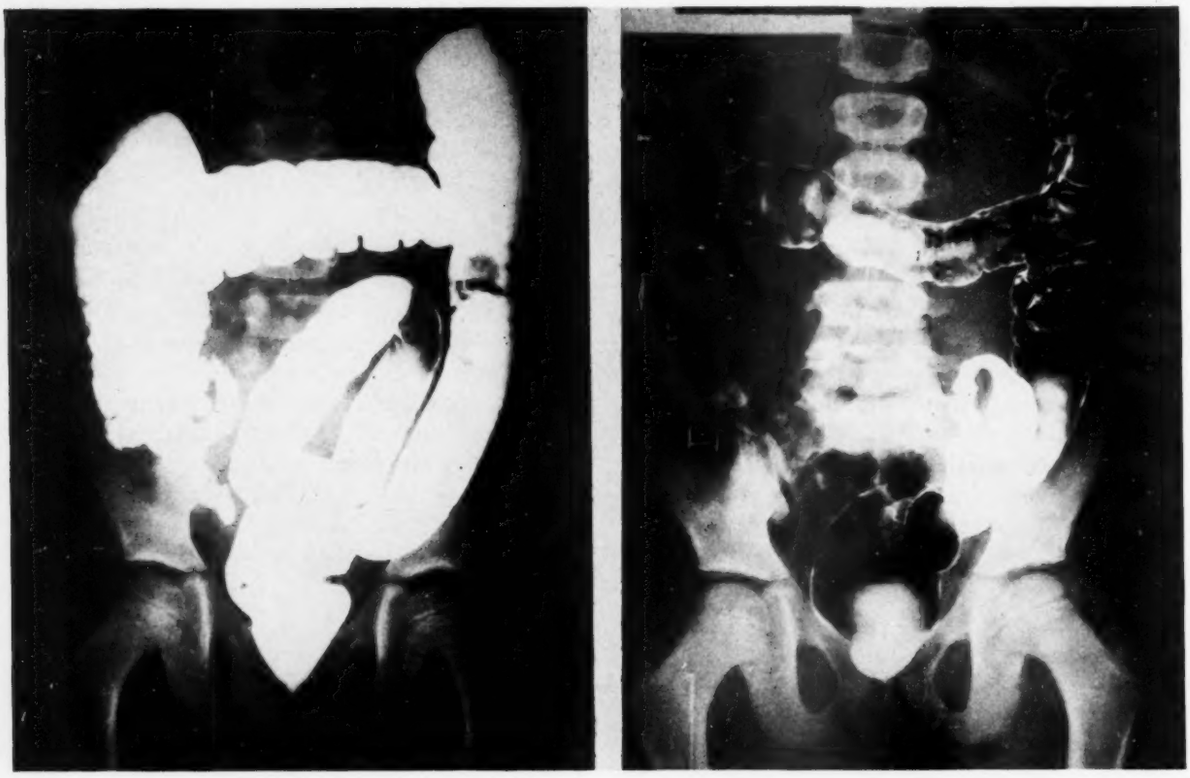
Experiences in the treatment of polyps of the large intestine at the Lahey Clinic have been presented in several communications.[1,8–10] Over 1,000 polyps of the rectum and rectosigmoid have been treated while seventy-eight patients have been submitted to colotomy for removal of polyps in the proximal segments of the colon. In addition, twenty-three patients have been operated upon for congenital polyposis. No statistical analysis will be presented but general considerations will be discussed and the operative procedures that have been employed will be outlined.

GENERAL CONSIDERATIONS

The incidence of polyps of the intestine is quite difficult to determine and depends upon the material analyzed; it has varied from 2 to 20 per cent in reported series. In autopsy series of adult patients which must be considered a selective group Swinton and Haug[9] found 7 per cent in 1,843 patients, or 311 with benign mucosal polyps. Helwig[5] found 9.5 per cent. As high as 40 per cent of patients have multiple polyps. Approximately 25 per cent of patients with malignancies have benign polyps found in the resected specimen. If one takes a special group of patients seeking proctologic consultation because of rectal symptoms, the incidence is between 5 and 10 per cent. It is probably safe to assume that at least 3 per cent of adult patients have benign polyps.

In view of the fact that only one-third of patients with benign polyps have symptoms it is immediately apparent that discovery of polyps in the remaining two-thirds of patients will be possible only when increasing numbers of sigmoidoscopic examinations are done in the routine examination of adult patients and this is recommended very strongly. This is one step in preventive medicine that offers real promise in reduction of the incidence of carcinoma of the large intestine which represents approximately one-eighth of malignancies.

* From The Department of Surgery, The Lahey Clinic, Boston, Mass.



A B

FIG. 1. A, barium enema (full) showing radiolucent defect of large polyp in descending colon; B, double contrast air enema outlining mucosal surface and pedicle of the polyp.

Intermittent or persisting bleeding is the only common symptom associated with benign polyps and this symptom occurs in only one-third of the patients. A few complain of increase in the discharge of mucus and in the occasional patient with a villous polyp a watery discharge may be present. At times, because of the large size of a polyp or because of partial intussusception, obstructive symptoms will be present.

Diagnosis of polyps of the rectosigmoid and rectum, where over one-half of them occur, should not be difficult. Adequate preparation of the bowel is essential and is best accomplished by castor oil or magnesium sulfate given the night before with cleansing enemas or colonic irrigations given one or two hours preceding the sigmoidoscopic examination. Too often attempts are made to do sigmoidoscopy with fecal material remaining in the bowel. Under these circumstances, when all of the mucosal surface cannot be visualized properly, small polyps are easily missed. Visualization of polyps in the proximal colon offers much greater difficulty. The same means of adequate preparation of the bowel are even more essential. Both the barium enema and double contrast air enema should be utilized. (Fig. 1.) We have seen many patients in consultation referred for treatment of multiple polyposis who on further examination were found to have a normal colon. The addition of tannic acid to the barium mixture in carrying out the contrast air enema is very useful. At least one repeat examination should be done for every patient discovered to have a colonic polyp to be certain that it can be visualized on second examination at the same site. This rule of repeated examinations will save the embarrassment of an appreciable number of negative abdominal explorations.

The surgical treatment of intestinal polyps can be divided into three groups: (1) polyps of the rectum and rectosigmoid, (2) colonic polyps and (3) congenital polyposis.

POLYPS OF THE RECTUM AND RECTOSIGMOID

The majority of polyps that can be visualized through the sigmoidoscope can be satisfactorily removed or destroyed by fulguration. It is essential that suitable equipment be available in order to do this safely. A special proctoscopic

table is necessary as well as an electrosurgical unit and strong suction. Preliminary biopsy of polyps of moderate or large size should be done routinely, but it is unnecessary to biopsy the small sessile mucosal polyps. Fulguration of polyps should be carried through the mucosa to the submucosa. It can be carried out as an office or out-patient procedure when the polyps are small or of moderate size when they are found below the peritoneal reflection. If they have a broad base or are of considerable size, they should be treated on repeated visits in order to avoid too much reaction in the bowel wall. Small polyps above the peritoneal reflection can also be fulgurated as an out-patient procedure. The broad, spreading villous type of polyp which so commonly produces a large amount of mucus requires repeated treatment and these all tend to recur. These patients must be followed for an indefinite period with repeated biopsies, but these polyps rarely tend to undergo malignant degeneration. In our experience only two of these have subsequently become malignant and required resection.

For the removal of larger polyps in the rectum and pedunculated polyps in the recto-sigmoid the patients should be admitted to the hospital so that they may be observed after treatment for twenty-four to forty-eight hours. The large polyps in the rectum can be removed by surgical excision after dilatation of the sphincters or division of the external sphincter. Rarely is it necessary to close the mucosa following this local excision, but rectal dilatation may be necessary for some weeks to prevent stricture.

When multiple polyps are present, it is important to confine fulguration to a few polyps at a time because of the marked reaction that may occur.

The complications following fulguration of polyps may be quite serious. Large arterial branches may be present in the pedunculated polyps, requiring slow fulguration to secure thrombosis of the vessels. Minor bleeding is not infrequent and occasionally serious hemorrhage demanding transfusions may be encountered. The use of coagulants, such as gelfoam and oxycel, in addition to further fulguration has materially aided in reducing the incidence of bleeding following fulguration. Peritoneal reaction following fulguration of polyps above the peritoneal reflection may be evidenced by fever, lower abdominal discomfort and cramps which may result in ileus. Actual perforation of the bowel may occur at the time of fulguration or subsequently as a result of deep fulguration. Perforation with localized abscess has occurred in two of our patients. In one patient with congenital polyposis the lower rectum was being prepared for anastomosis of the ileum to the lower segment. Unquestionably, too many polyps were treated at one time and at the time of abdominal exploration a local abscess was encountered, necessitating drainage and delay in completing the colectomy. The second patient had localized pelvic abscess which could be felt upon pelvic and rectal examination but which subsided spontaneously.

Use of the endotherm snare for the removal of large pedunculated polyps in the rectum is not without danger. It is probably best, when these polyps cannot be removed by surgical means, to destroy them gradually until the base can be properly identified when the projecting portion has already been removed. In one patient, seventy-five years of age with a large polypoid tumor in the rectum in whom we removed the polyp by an endotherm snare, we found upon further inspection with the sigmoidoscope that appendices epiploicae of the sigmoid were visible from within the peritoneal cavity at the base of the polyp. Immediate abdominoperineal resection was begun and the patient made a good recovery. There was no evidence of malignancy in this large polyp. Abdominoperineal resection may be the procedure of choice in some of these large rectal polyps even though malignancy may not be demonstrated. Earlier in our experience we performed local excisions of some of these large rectal polyps which showed malignant adenomas. Resection of the rectum was carried out subsequently because of the histologic findings, without demonstration of residual malignancy in the resected specimen. Because of this experience, we have more recently removed polyps of this type locally and followed them up carefully by repeated sigmoidoscopic examination and further biopsy and a considerable number have had no further recurrence. A series of twenty-two of these patients has previously been reported by Swinton.[8] If recurrence or positive biopsy is subsequently demonstrated, abdominoperineal resection is carried out.

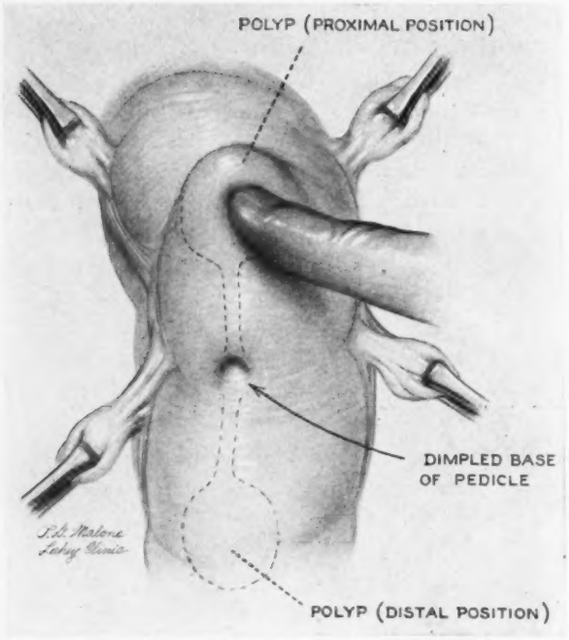


FIG. 2. The sigmoid has been freed and the polyp located. The diagram shows polyp being displaced proximally with a dimple appearing at its attachment.

COLONIC POLYPS

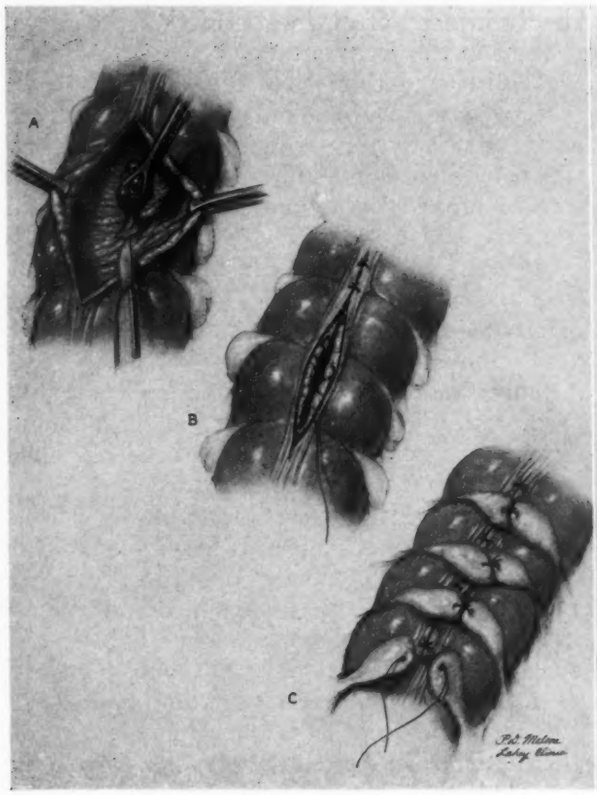
The management of polyps in the proximal colonic segments offers many difficult problems.[3,4,7] They are not only difficult to demonstrate by the best roentgenographic means available, but they may likewise be difficult to localize at the time of operation even after good visualization by the air contrast enema. After considerable experience we have learned that the segment containing the polyp must be well mobilized by dividing its parietal attachments so that it may be delivered outside the abdomen. This not only enables facility in palpation but also makes the operative procedure of colotomy safer.

Adequate preparation of the intestine is essential in the preoperative preparation of these patients. Single or repeated doses of magnesium sulfate followed by colonic irrigations will accomplish mechanical cleansing and emptying of the colon. We utilize sulfathaladine in 2 Gm. doses, given five times a day, for a short period before hospitalization and during the hospital preparation for surgery. It is impossible to localize accurately small polyps within the colon unless all fecal material has been removed. In one patient operated upon during the last year, in spite of the usual preparation, the colon was poorly prepared and the polyp could not be found. After further studies to make certain that the polyp was present reoperation was necessary for its removal. Adequate preparation should avoid this disturbing occurrence.

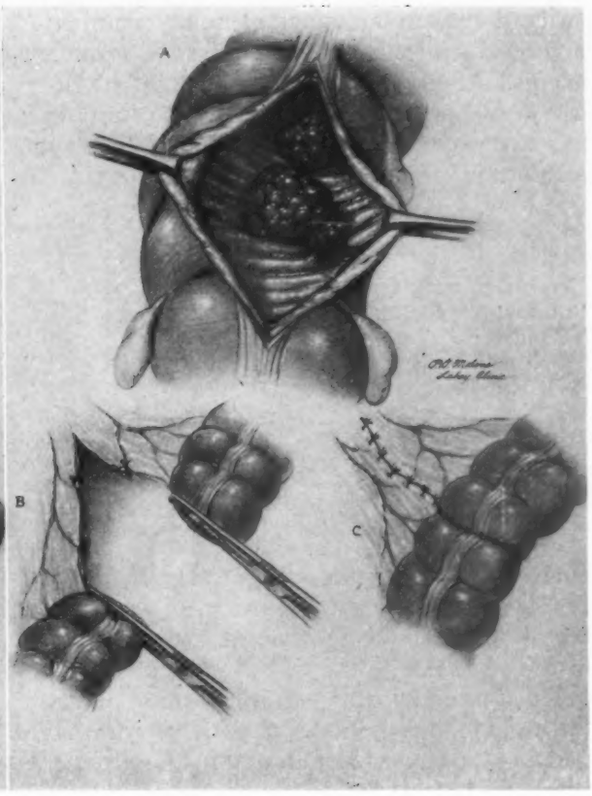
We utilize spinal anesthesia, either with the single dose method with pontocaine weighted with glucose or fractional spinal, for carrying out operative procedures for the removal of polyps. This permits the greatest possible ease in complete exploration of all of the colonic segments which is so important in view of the multiplicity of polyps. General anesthesia supplemented with curare may likewise produce satisfactory operative conditions.

Since most polyps are located in the descending colon or sigmoid, exploration is carried out through a left rectus incision. Complete abdominal exploration is carried out. All segments of the colon are carefully explored for any possible additional lesions. In one patient a large polyp in the descending colon had been demonstrated easily without other lesions being evident in the roentgenogram. This polyp was easily felt but at the time of exploration an early carcinoma was felt in the right colon, emphasizing the importance of this careful exploration.

Particular attention is paid to exploration in the area suspected of containing the polyp. This is best accomplished after detaching the parietal peritoneum and severing the fascia propria which anchors the mesocolon posteriorly. The polyp frequently will be found some distance from where it appears in the roentgenogram either because of a long pedicle or because of distortion in the film. Palpation of the bowel is best done with the finger passed longitudinally along the bowel, pressing it back against the mesentery. (Fig. 2.) This avoids the rounded appendices epiploicae or diverticula which may be encountered and may simulate polyps. After identifying the position of the polyp this segment of the bowel may be held by four clamps or traction sutures on the appendices epiploicae. The polyp should then be displaced as far proximally as possible (Fig. 2) and the area on the bowel marked. The procedure is repeated, displacing it distally, and a point selected mid-way between the two extremes for incision into the colon. Since most of the polyps in the colon are pedunculated and can be visualized by roentgenographic means, this maneuver will greatly aid in their identification and removal. The pedicle of the polyp



3



4

FIG. 3. A, incision has been made on the amesenteric side of sigmoid through a longitudinal band, the polyp elevated and excision begun; B, mucosa is being inverted with continuous suture and approximation sutures begun of seromuscular coat; C, suture line completed with appendices epiploicae approximated to reinforce the suture line.

FIG. 4. A, colotomy incision exposed multiple polyps; B, segmental resection performed; C, end-to-end anastomosis completed.

can frequently be felt if the attachment of the pedicle is on the amesenteric wall. When it is displaced, a dimple will appear (Fig. 2) which should be included in the incision. If it is attached to the posterior or mesenteric wall, the base cannot be definitely identified. Palpation may demonstrate induration of the base. If this is present, primary resection and anastomosis is proceeded with biopsy.

A longitudinal incision is made at the point selected, spreading the muscularis before opening the mucosa. This leaves a large amount of mucosa exposed to permit satisfactory inversion at the time of closure. The polyp is elevated and inspected, with particular attention paid to the mobility and freedom of the base. (Fig. 3A.) The pedicle is widely excised beyond a clamp, followed by suture ligature ligation or actual suture closure, including the mucosa and submucosa. Immediate frozen section should be done with particular attention paid to section through the base.

If the polyp is large and spreading, even though it is proved benign after opening the bowel and doing a biopsy, local resection should be started with end-to-end anastomosis (Fig. 4A–C) since local excision of the polyp may be followed by stricture. If an early malignant change is noted in the periphery of the polyp but the base is entirely free, local excision is justifiable. If there is any question about it, segmental resection should be done. To complete the closure of the bowel the mucosa is closed separately with a continuous running Connell suture inverting the mucosa. (Fig. 3B.) Following this, the muscularis and serosa are approximated but not folded over with interrupted non-absorbable sutures. (Fig. 3B.) The entire suture line can be reinforced by folding over appendices epiploicae across the closure. (Fig. 3C.)

During the postoperative period we have not continued sulfathaladine. If there has been any soiling, penicillin is given prophylactically

twice a day in amounts of 100,000 units. A low residue diet is given for a few days and no enemas are given during the hospital stay. Oil can be given by rectum if necessary to obtain a movement. The use of Miller-Abbott tube intubation of the small intestine for two or three days may be an additional safety factor. Dilatation of the rectum with an indwelling rectal tube should be done at the completion of the operation.

TABLE 1
COLONIC POLYPS

Descending colon and sigmoid	72	
Proximal colon	6	
Transverse	4	
Splenic flexure	1	
Hepatic flexure	1	
Total	78	
Postoperative deaths		2 (2.6%)
1 peritonitis		
1 mesenteric thrombosis		

It is quite important to follow these patients for an indefinite period. All patients who have had a polyp should be followed just as a patient is followed after resection for malignancy. Any patient who has had a polyp has a much greater chance of having a subsequent polyp or malignancy. Subsequent sigmoidoscopic and roentgenographic examinations are done for the first and second year after operation and later if symptoms recur.

Our experience at the Lahey Clinic in the removal of colonic polyps by colotomy include seventy-eight patients. (Table 1.) The striking thing is the large number occurring in the descending colon and sigmoid, with seventy-two found in this position. Only six were discovered in the right and transverse colon, including the hepatic and splenic flexures; four were in the transverse colon while one each was removed from the flexures. This is in contrast to the incidence of polyps in these segments of the bowel found by Swinton and Haug in autopsy material. In their total cases of 311, 64 were in the right colon, 85 were in the transverse colon including the flexure and 162 in the descending colon and distal segment. This further indicates how inadequate our present methods are of diagnosis of polyps in the proximal segment of the bowel. The lesions in these cases are rarely discovered before malignant degeneration occurs with the production of typical symptoms of carcinoma. We are badly in need of diagnostic methods to reveal polyps in this location.

During the time that these seventy-eight polyps have been removed exploration has been avoided many times when polyps were suspected or considered present but were ruled out by repeated examinations. Four additional patients had explorations, with negative findings even though it was believed that polyps had been demonstrated. One patient was subsequently operated upon with discovery and removal of a polyp.

There were two deaths following colotomy, a mortality of 2.6 per cent. Both of these occurred in 1941. No death has occurred since 1941.

The first patient was a man of fifty-four who had had blood and mucus in his stools for two months. Sigmoidoscopic examination revealed two polyps of the rectosigmoid, one of which showed signs of recent bleeding. These were destroyed by fulguration. A double contrast enema showed a polyp, 1.5 cm. in diameter, in the sigmoid. Repeat examination confirmed this finding. On April 11, 1941, the polyp was removed by colotomy and was found to have a pedicle 3 cm. in length. The base was free and frozen section was negative but subsequent permanent section showed malignant adenoma in the periphery. He developed signs of peritonitis and bronchopneumonia two days after operation. Cecostomy was performed on the fifth postoperative day but he died the following day. No autopsy was performed.

The second patient was a man of forty-seven years. He was first examined May 7, 1941, complaining of diarrhea and rectal bleeding of six years' duration. He had been treated for colitis. Three years previously hemorrhoidectomy had been performed without relief of symptoms. Sigmoidoscopic examination was negative. Double contrast air enema showed a polyp 3.5 cm. in diameter, with a long pedicle in the mid-sigmoid. The barium enema showed a large radiotranslucent area which was thought to be 5.0 cm. in diameter.

On June 4, 1941, sigmoidotomy was performed and immediate frozen section showed a mucosal polyp without evidence of malignancy but subsequent section showed a small area of adenocarcinoma. On the fourth day postoperatively he appeared to have ileus and acute dilatation of the stomach. Intubation relieved him but his symptoms recurred and

he died on the eighth postoperative day. Autopsy showed a mesenteric thrombosis of the proximal jejunum with infarction, thrombosis of the portal vein and infarct of the liver and spleen. The sigmoidotomy incision was healing satisfactorily. The cause of death was mesenteric thrombosis of the jejunum. It is difficult to explain this in view of the negative heart findings unless it was caused by trauma from a retractor.

TABLE II
COLONIC POLYPS

Previous to 1940	11*
1940	5
1941	7
1942	7
1943	7
1944	4
1945	4
1946	15
1947	13
(4 months) 1948	5
Total	78

* Ten previously reported (Cattell and Swinton).

Our experience since 1940 in the treatment of intestinal polyps indicates that the number encountered is directly related to our interest in the problem and a more careful survey of patients having rectal bleeding. In Table II it will be seen that in the past three years the number treated has been markedly increased. In 1946 fifteen polyps were operated upon, in 1947, thirteen and in the first four months of 1948 five have been removed.

In view of our increasing experience and with technical improvements in operation, use of antibiotic drugs and the fact that no deaths have occurred in the past six years we believe that colotomy can at present be done safely. One problem relative to the treatment of colonic polyps remains unsettled. One-fourth of the patients who have had colotomy with removal of polyps have shown early malignant changes in the periphery of a pedunculated polyp. This is usually not discovered at the time of operation in spite of frozen sections but only in the permanent histologic sections. During the time these polyps have been removed a considerable number of patients have been operated upon with this diagnosis but at the time of exploration were found to have definite carcinoma and were submitted to resection. These have not been included in the series. A decision should be reached in the light of past experiences whether resection should be done in all patients that show any change suggesting malignancy. Our personal experience at this time is that local excision of the polyp when there is no involvement of the base results in cure. Longer follow-up on many of these patients may show later that resection should have been undertaken at the initial procedure.

TABLE III
CONGENITAL POLYPOSIS
Operative Procedure

Ileostomy and total colectomy		6
Ileoproctostomy and subtotal colectomy		12
One-stage	2	
Two-stage	5	
Mikulicz	5	
Abdominoperineal resection		5
Hemicolectomy and abdominoperineal	3	
Abdominoperineal	2	
Total		23

CONGENITAL POLYPOSIS

The management of congenital polyposis is a serious problem. These patients are usually discovered with this disease as young adults and the surgical treatment necessarily requires an extensive procedure which should include removal of all the colon and usually the rectal segment as well, making a permanent ileostomy mandatory. The condition is frequently not discovered until malignant degeneration occurs in one or more areas which may require modification of the surgical procedure of choice. Polyposis may be discovered during routine rectal examinations when irregularity of the mucosa is noted or definite polyps are palpated. Bleeding is the most conspicuous symptom and at times massive hemorrhage occurs and may continue, jeopardizing the life of the patient. The diagnosis can be confirmed by sigmoidoscopic examination and the extent of the process and the size of the polyp can be well determined by double contrast enemas. This condition unfortunately occurs as a dominant mendelian characteristic so that the majority of a family may be found to have the condition.[2,6] Fortunately, the condition is rare, occurring in our experience in approximately 0.5 per cent of patients with large intestinal lesions coming to operation.

Many operative procedures have been used in the treatment of congenital polyposis but most of them have been inadequate for the condition. The certain occurrence of malig-

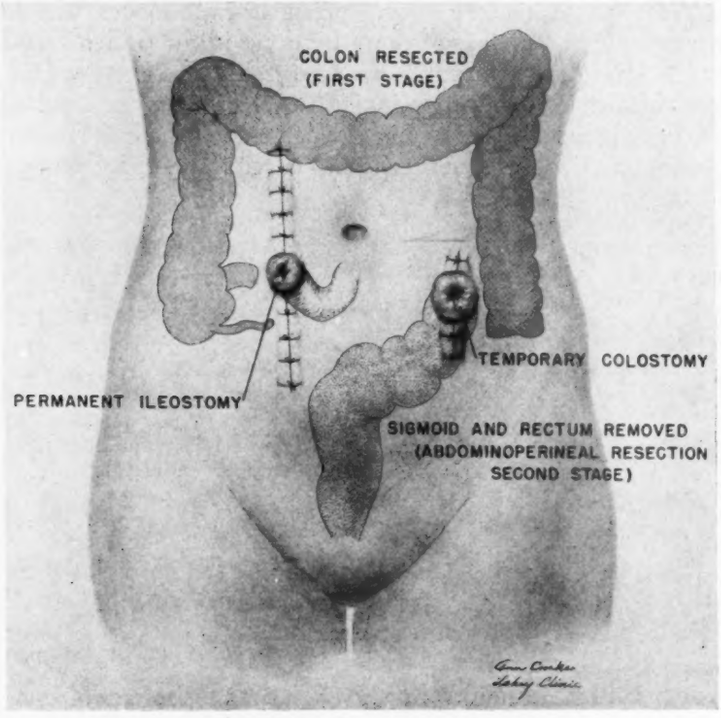


FIG. 5. Operation of choice for congenital polyposis, two-stage operation with permanent ileostomy. First stage, ileostomy established and the right, transverse and descending colon resected with implantation of the sigmoid. Second stage, resection consists of abdominoperineal removal of sigmoid and rectum.

nancy in all of these patients justifies a more radical attack than has usually been adopted in the past. Colotomy with removal of multiple polyps has been employed but has no place in the present day treatment of this condition. Local or segmental resection for larger polypoid areas or in the presence of malignant degeneration has likewise been used but is unsatisfactory. Subtotal colectomy, after destruction of as many polyps as possible in the rectal and rectosigmoid segments, has given somewhat better results but is not adaptable to most patients since the distal segment usually has the greatest involvement with polyps. *The treatment of choice is permanent ileostomy and total colectomy, including abdominoperineal resection.*

Our experience with congenital polyposis has not been satisfactory when subtotal colectomy has been employed although one patient has been followed twice a year for fifteen years without developing malignancy. In view of the present day improved management of ileostomy total colectomy is justified and recommended for all patients having congenital polyposis.

In Table III the operative procedures which we have employed are listed. In more recent cases we are employing two-stage colectomy with ileostomy as soon as they are discovered whether malignancy has already developed or not (Figs. 5A and B.) For patients on whom subtotal colectomy has been done we have used three different types of operative procedures. In two patients colectomy was done in one stage with removal of the colon and end-to-end anastomosis of the ileum to the rectosigmoid. (Fig. 6.) In three the ileum was anastomosed to the rectosigmoid as the initial stage followed by subtotal colectomy (Fig. 7.) In these five patients the operative procedures were preceded by careful fulguration of the polyps in the rectal segment. In two patients ileostomy was performed with division of the sigmoid and implantation of the distal sigmoid. In five patients subtotal colectomy was done by a modified Mikulicz procedure, doing the anastomosis as low as possible. In these five patients fulguration of the polyps in the distal segment was performed after the operative procedure since there was diversion of the fecal stream. In

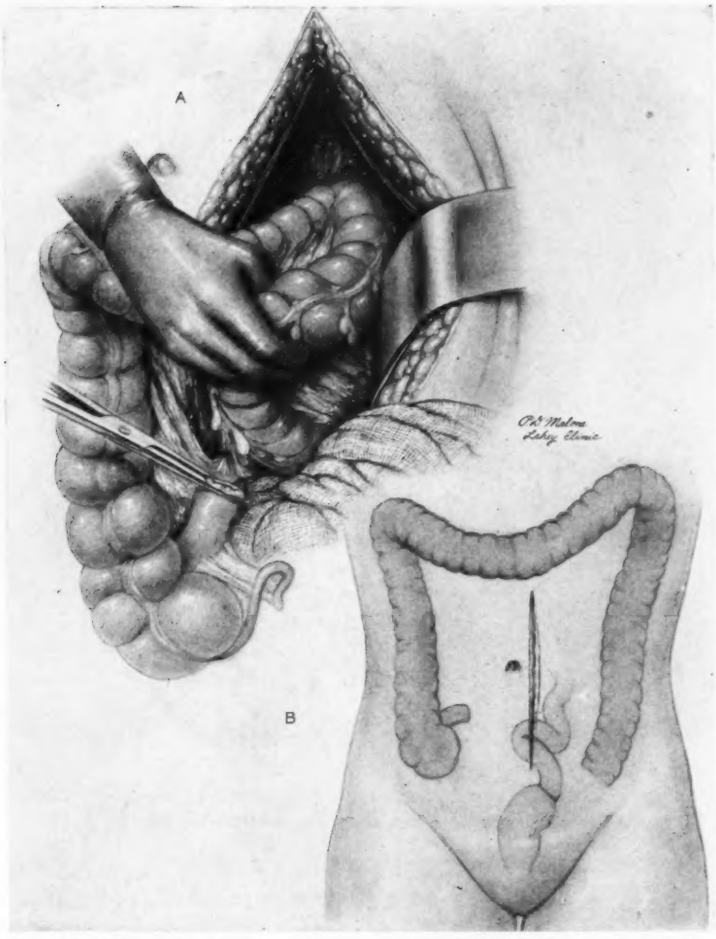


FIG. 6. Subtotal colectomy for congenital polyposis. A, ileum has been divided; the right, transverse and descending colon have been freed; B, diagrammatic sketch showing end-to-end ileoproctostomy. The shaded portion is removed.

patients with implantation of the sigmoid fulguration was carried out both through the proximal end and from below. In spite of careful follow-up in one of these patients cancer developed above the anastomosis and when the patient was submitted to resection, metastases had already occurred. Hemicolectomy and abdominoperineal resection with removal of all the colon beyond the mid-transverse colon was performed in three patients and the operative procedure limited to this in view of extensive carcinoma present in the distal segment. If recurrence does not take place within a period of two years, the proximal bowel should be removed, with the performance of ileostomy. Two patients had abdominoperineal resection alone because of extensive malignancy and both subsequently died of recurrence.

In view of this discouraging experience with the so-called conservative operations of segmental or subtotal colectomy we are of the opinion that ileostomy and total colectomy should be performed in all cases.

SUMMARY

Intestinal polyps occur with sufficient frequency to constitute an important surgical problem.

Over 50 per cent of polyps occur in the distal bowel within visualization of the sigmoidoscope. Biopsy of these lesions should be used to exclude malignancy. They may be destroyed or removed by fulguration.

Polyps occurring in the proximal segments of the colon should be removed by colotomy. At the time of exploration frozen section should be done and, depending upon the findings, local excision of the polyps or resection of the colon performed.

A B

FIG. 7. Subtotal colectomy for congenital polyposis; a two-stage operation consisting of ileosigmoidostomy followed by colectomy. Patients followed fifteen years with repeated fulguration of polyps in the rectal segment. A, a full barium enema; B, empty film showing dilatation of the ileum.

Methods of localization of colonic polyps have been demonstrated and the technic of removal illustrated.

A series of seventy-eight colonic polyps removed by colotomy are reported. There were two operative deaths, a mortality of 2.6 per cent.

All patients who have been treated for intestinal polyps should be followed carefully by repeated sigmoidoscopic and roentgenographic studies for an indefinite period. They have a higher incidence of subsequent malignancy than normal individuals.

Surgical treatment of twenty-three patients with congenital polyposis is recorded. The operative procedure of choice is ileostomy and total colectomy in two stages.

REFERENCES

1. CATTELL, R. B. and SWINTON, N. W. The diagnosis and treatment of sigmoidal polyps. *New England J. Med.*, 222: 535–540, 1940.
2. DUKES, C. E. The hereditary factor in polyposis intestini or multiple adenomata. *Cancer Rev.*, 5: 241, 1930.
3. ERDMAN, J. F. and MORRIS, J. H. Polyposis of the colon. *Surg., Gynec. & Obst.*, 40: 460–468, 1925.
4. FITZGIBBON, G. and RANKIN, F. W. Polyps of the large intestine. *Surg., Gynec. & Obst.*, 52: 1136, 1941.
5. HELWIG, L. C. The evolution of adenomas of the large intestine and their relation to carcinoma. *Surg., Gynec. & Obst.*, 84: 36–49, 1947.
6. MAYO, C. W. and WAKEFIELD, E. G. Disseminated polyposis of the colon. *J. A. M. A.* 107: 342, 1936.
7. ROSSER, C. Management of surgical lesions of the left colon. *J. Internat. Coll. Surgeons*, 11: 17–23, 1948.
8. SWINTON, N. W. Diagnosis and treatment of mucosal polyps of the rectum and colon, with early malignant change. *Am. J. Surg.*, 75: 369–379, 1948.
9. SWINTON, N. W. and HAUG, A. D. The frequency of precancerous lesions in the rectum and colon. *Labey Clin. Bull.*, 5: 84–88, 1947.
10. SWINTON, N. W. and WARREN, S. Polyps of the colon and rectum and their relation to malignancy. *J. A. M. A.*, 113: 1927–1933, 1939.

DISCUSSION OF PAPERS BY DRS. SCARBOROUGH AND KLEIN AND DR. HELWIG AND DR. CATTELL

CLAUDE F. DIXON (Rochester, Minn.): It has been my belief, after the teaching of the late Dr. Robertson, that if one has an epithelial hyperplastic polyp of the colon and lives long enough

it will practically always become malignant. This action may take a number of years. I have no idea of guessing at the length of time required for a true epithelial adenomatous polyp to become malignant. It is worth emphasizing that 18 to 20 per cent of the segments removed because of carcinoma will show small polyps 5 or 6 cm. away, usually cephaled, from the original carcinoma. Why these develop I do not know but it is true that polyps do occur in fairly close proximity in about one-fifth of those patients in whom cancer of the colon is removed, particularly on the left side.

It is not always easy at the time of operation to find a polyp in the bowel, as Dr. Cattell and others have mentioned, especially if the polyp is of the soft, papillary or villus type. Some years ago I began using a Cameron cold light to transilluminate the bowel, and that procedure has saved me a great deal of embarrassment on many occasions. By such a method as Dr. Helwig demonstrated microscopically I have been able by using an infra red camera to photograph polyps before the bowel was opened and to demonstrate a blood vessel running up the pedicle and out into the periphery of the lesion.

Regarding familial or congenital polyps, I must say that my experience—perhaps wrong—has been somewhat divergent from that of Dr. Cattell. When the proctologist is able to fulgurate the polyps in the rectum and rectosigmoid and does not find an ulcerating carcinoma, I have carried out a subtotal colectomy with, as he demonstrated, an anastomosis between the ileum and the rectosigmoid. This is done as a rule in two stages. I have found that if the fulguration process is carried out first the bowel becomes white and thickened, and an anastomosis is difficult and may be fraught with danger; therefore, I have made such anastomoses truly in myriads of these polyps, and fulguration by the proctologist has been carried out later. Perhaps some of these will recur as Dr. Cattell has stated. I am certain that only time will answer that question. Some of my patients treated in this manner have lived ten or twelve years.

That the true epithelial pedunculated polyp will become malignant if the patient lives long enough is demonstrated by the following two examples:

The first patient was told he had a polyp which accounted for the intermittent bleeding. Surgical treatment was refused. Seventeen years later he had an ulcerating carcinoma in exactly the same place as the polyp; the carcinoma was removed. He did not have metastasis and made an uneventful recovery. The second patient had a polyp in the descending colon. He, too, refused surgical treatment which, as Dr. Cattell said, should have been colotomy. When he returned to the clinic four years later, a definite filling defect caused by an ulcerating carcinoma was found upon roentgenographic examination of the colon. A segmental, two-stage resection was carried out and recovery followed.

Carcinoma superimposed upon polyps of the colon in which long-standing chronic ulcerative colitis has been present has interested me for a long time. I am not at all certain that I have a clear conception of the condition except that, in so far as I know, lesions of a malignant nature occurring in the colon of a patient who has had long-standing ulcerative colitis are usually of high grade (grade III or grade IV). We have had only a few patients live more than five years. Most of them die within three years. The question comes up then: Where and why does the cancer develop? Some have stated that it develops from the polypoid tissue between the ulcerated areas. I have seen such lesions but at the present time I am of the belief, from what I have been told and from what has been demonstrated to me, that such malignant lesions frequently occur at the edge of the ulceration and not, as a rule, on the hyperplastic epithelial polyp as Dr. Helwig so clearly demonstrated here. I may be wrong in my conception of this, but it is sufficient to say that in a number of patients who have ulcerative colitis cancer develops.

In conclusion, I should like to say that if we knew why a polyp undergoes malignant change certainly we would have a good start in learning the cause of cancer.

GEORGE E. BINKLEY (New York, N. Y.): I should like to limit my remarks to polyps of epithelial origin. There is little room for disagreement with the three authors. However, a number of points are worthy of emphasis. It is gratifying to hear Dr. Scarborough's and Dr. Helwig's classification because they are recognizing more than one type of adenomatous polyp.

We have no proof in our clinic that the areas of hyperplasia become malignant, but I am inclined to have the same suspicion as Dr. Helwig that these areas may at times be the primary focus of non-malignant polyps or intestinal cancer. The adenoma and the papillary adenoma are definitely precancerous lesions and will become malignant if not removed.

Dr. Scarborough's report on malignant nodes in cases of malignant adenoma attached to the colon wall by a pedicle is very interesting. So far we have not found any cases of this nature in our series. One must agree with Dr. Scarborough that papillary adenomas are not a group of innocent polyps. While a fair percentage will be found to be non-malignant, many others will show atypical changes or definite cancer. He found 30 per cent with malignant change; we found 68 per cent with malignant change. This high percentage was encountered either at the time the patient came

under treatment or malignancy developed in polyps that were not completely removed. It required twelve to fifteen years in some instances for the malignant change to occur.

Everyone seems agreed that polyps of the colon and rectum are occurring more frequently. Therefore, greater emphasis should be given to diagnosis. I agree with Dr. Cattell that the colon must be clean if these lesions are to be recognized. It is not always possible to cleanse the colon thoroughly for a barium enema investigation with a one-day preparation. We are taking two and three days for preparation in many cases and find the addition of tannic acid to the barium a valuable asset. The majority of lesions situated in the lower sigmoid and rectum are easily recognized by proctoscopic and sigmoidoscopic examinations. The lower sigmoid should always be inspected when polyps are suspected. I have removed a polyp through the proctoscope, from the sigmoid, in two patients who previously had been subjected to laparotomy for rectal bleeding. Adenomas within reach of the sigmoidoscope may be removed, as stated, by fulguration or electric snare. We prefer snare removal to fulguration.

The treatment of papillary adenomas of the rectum is a real problem. I believe Dr. Scarborough removes a number of them with the electric snare. Dr. Cattell mentioned surgical excision. There is no routine method for removing these wide-based polyps. The treatment of choice may be removal with electric snare or removal with electric snare followed by radiation therapy, surgical excision or partial or complete resection of the rectum. Each patient presents an individual problem. At times in these elderly people it seems wiser to treat the patient in a palliative rather than a radical manner although the disease by the palliative method may never be completely eradicated.

It would like to emphasize the importance of a clean bowel in all those who require colon surgery. The type of colotomy advocated by Dr. Cattell is suitable in the majority of cases. In the more extensive disease we are using the Mikulicz procedure and local resection with end-to-end anastomosis while colectomy is the method of choice in cases of multiple polyposis.

Frederick B. Campbell (Kansas City, Mo.): I believe that qualified proctologists for the most part give adequate treatment to those who reach them, but their usefulness may be extended if the importance of early diagnosis and the simplicity of treatment were frequently discussed at staff meetings, county society meetings and state meetings. All practitioners should be made more aware of the importance of blood in the stool and taught the use of the sigmoidoscope. As more internists employ sigmoidoscopy as a part of the general physical examination more asymptomatic polypoid lesions can be found and proper treatment advised. This could be made an important phase of the cancer detection program, if efficiently carried out, and in my opinion in many cases we would have cancer prevention rather than cancer detection.

I had the privilege of reading Dr. Scarborough's paper prior to this meeting and I found nothing with which I could disagree. We have not noted the local recurrence of polypoid lesions removed by fulguration such as reported by Dr. Scarborough; however, this may be due to inadequate follow-up on our patients since we have had recurrences in clinically and pathologically malignant polypoid lesions which were fulgurated when major surgery was not advisable. In treating these lesions the error should be on the side of overtreatment rather than on the side of undertreatment.

We have also noted lymphoid elevations, as we assume them to be in those with anorectal infection, which cleared up when the infection was removed. Dr. Scarborough's remarks on bleeding in diverticulosis should also be remembered, and we should not assume that no polypoid lesion is present when the x-ray is negative.

Except in unusual or in those we consider doubtful cases, we now very seldom secure a biopsy specimen in a pedunculated polypoid lesion showing no ulceration and which is of such a size and location as to be suitable for removal as an office procedure. We have simply assumed that we are dealing with either a very early malignant lesion or a premalignant lesion, and our method of treatment would rarely be influenced by the pathologic report.

Not only may a normal rectum or sigmoid be sacrificed by improper evaluation of the clinical findings and of the pathologic report but another grave injustice may result. In insurance matters, for instance, when a diagnosis of carcinoma becomes a part of the record, the insurance company has no way of knowing that adequately fulgurated lesions do not recur and an individual actually has become a better risk.

The pathologists can be our greatest comfort when we are troubled by indecision. I have sent tissue from the operating room to Dr. Helwig's laboratory. He has then come to the operating room to learn something about the history of the patient and the exact source of the specimen presented before making his diagnosis because he realizes that he is to influence an important decision. That is one indication of a good pathologist.

I should like to mention use of the electric snare only to condemn it for general use. In the hands of the untrained and the inexperienced it is an exceedingly dangerous instrument when applied above the peritoneum. For those who have learned its use the hard way it can be a handy tool, and on rare occasions it can be useful—but it is dangerous.

I believe its use should be discouraged for lesions above the peritoneum.

It is not amiss again to emphasize that in large polypoid neoplasms, as mentioned by Dr. Cattell, it is, as a rule, much safer to do repeated fulgurations rather than attempt to complete the operation at one time. The greatest caution should be used in treating children in whom the bowel wall is extremely thin.

I have had the same experience as Dr. Cattell had in the removal of a large polypoid tumor in the rectum which required immediate resection; in that case our custom of preparing the bowel in all such cases, as it is for any resection, paid off well. I must agree with Dr. Cattell who believes that polyps of the rectum and lower sigmoid should be fulgurated before the ileosigmoid anastomosis has been done in diffuse polyposis requiring subtotal colectomy. The line of anastomosis must go through the mucosa containing polypi, some of which may already be undergoing early malignant changes, and fulguration of the anastomotic line with its questionable blood supply and scar tissue could be hazardous. If the anastomosis is done too high, additional adhesions and fixation of the lower segment may make it difficult or impossible properly to visualize the anastomosis from below and the discharge of ileal contents adds to the difficulty.

Unless there are urgent contraindications, it has been my experience that it is easier to fulgurate before surgery; then it may be possible to save more of the sigmoid than one would dare to do otherwise, and the anastomosis can be done without fear of including a polyp in the suture line.

A hereditary factor is recognized in diffuse polyposis of the familial type. May not the same factor apply to discrete polyposis?

I have a small series of cases in which one or more polyps were found in individuals who came in for rectal examination because the parent had carcinoma of the rectum or sigmoid. I believe we should advise such an examination of the sons and daughters of cancer patients.

Dr. Binkley mentioned the usefulness of a temporary colostomy for the removal of several polyps from the descending or transverse colon. On several occasions we have done a temporary colostomy for the removal of several polyps by fulguration through the sigmoidoscope, and in this way small polyps not shown by x-ray may be fulgurated. In selected cases this may not be too large a price to pay for minute observation under direct vision.

Douglas A. Sunderland (New York, N. Y.). Being a pathologist, I naturally am extremely interested in the papers of Dr. Scarborough and Dr. Helwig. I do not believe that I am qualified to venture any opinion on the causative relation between areas of hyperplasia and incidence of carcinoma of the bowel. I have not done much work in that line. I am chiefly interested in the remarks that were made on papillary adenomas. Our figures at Memorial, in our series of forty-eight cases, very closely approximate those of Dr. Scarborough. He has an incidence of 30 per cent of carcinomas arising from papillary adenomas and, as Dr. Binkley said, we found 68 per cent of the patients to show *in situ* carcinoma. Only 39 per cent showed actual invasive carcinoma.

I am certainly in very great accord with both Dr. Scarborough and Dr. Helwig on their statements that a pedunculated adenoma in which an area of carcinoma is present should be considered as a clinically benign lesion if the muscularis mucosae of the pedicle is not invaded. I think in all such cases that we have had we have not as yet seen metastasis unless the muscularis mucosae of the pedicle was invaded.

In contrast to Dr. Scarborough's statement that most of the areas of carcinomatous change in papillary adenomas occur in the base, we found it to be about equal in all parts of the tumor—many times in the superficial and central portions as well as the base and in some cases in multiple areas throughout.

I was also very much interested in the excellent photomicrographs shown by Dr. Helwig, and especially interested in one of his pictures where he showed cystic dilation of the glands in one of the adenomas. We have noticed this very often in papillary adenomas and we have also noticed that in the carcinomas that arise in papillary adenomas we have a much higher proportion of colloid cancer than is found in rectal and colonic carcinomas as a whole. This led us to wonder if the cystic dilatation and excess mucus production had any relation to the appearance of colloid carcinoma but unfortunately we were not able to establish any correlation.

I should like to repeat what Dr. Binkley mentioned about the malignant change in papillary adenomas. Even though there were areas of invasive cancer within the substance of the polyp we have seen no distant metastasis unless the bowel wall itself were invaded.

Neil W. Swinton (Boston, Mass.): This symposium illustrates an apparent fact, that is, the importance of the cooperation of the clinician, radiologist and pathologist.

We have been impressed with the number of patients referred to us with rectal tumors who had had a biopsy specimen taken, the slides sent along with the patient and the patient had been told he had cancer. I cannot give you accurate figures, but in a surprising number of those patients we have failed to agree with the diagnosis of cancer. We have repeated the biopsies and have carried out exhaustive studies in these cases and have decided

against radical resection. There may be a tendency to perform resection in too many of the borderline cases of rectal polyps.

All of us who are doing clinical work, particularly biopsies, must confer carefully with the pathologist. Many times the diagnosis of malignant disease cannot be settled at the time of immediate section; the late sections must be studied. I usually go to our laboratory, sit down with the pathologist and go over every angle of the patient's record and all of the findings before I make a final decision for or against radical resection in the borderline cases.

One other thing with regard to the roentgenologic examination—it has been pointed out repeatedly that it is not easy to diagnose small tumors in the rectosigmoid region. As an experiment during recent months I referred to our radiology department 150 patients on whom I had carried out proctoscopies. In that group I found fifteen patients with tumors that I could see. With every known means at the radiologist's command, repeated examinations, both barium enema and contrast films, with separate preparation on different occasions and knowing that the tumors were there before he began the examination he could confirm the diagnosis of tumors in only five of the fifteen patients.

Albert G. Schutte (Milwaukee, Wis.): In the past two years I observed two male patients, nineteen and twenty-two years old respectively, who had had subtotal colectomy and ileosigmoidostomy for familial polyposis. In one instance the patient had abdominal metastases and an inoperable carcinoma of the lower end of the sigmoid near the stoma. The other patient had not been observed in two years but had had an ileosigmoidostomy done eight years previously. He had been married in the last two years and he failed to report for observation; when he did, an early adenocarcinoma was found in the blind end of the remaining sigmoid which necessitated resection of the rectum and permanent ileostomy.

These cases emphasize that if an ileosigmoidostomy is done and the rectum is left the patients must be observed regularly and continuously for the rest of their lives while if the rectum is removed you can forget about it. This is something to think about.

G. M. Brown (Bay City, Mich.): This argument as to whether we should use a snare or whether we should fulgurate leads us to think that both methods are useful. The difficulty comes in whether or not we know the machine we have it attached to.

I have had experience with four or five different machines in the course of the past twenty years and I have found it quite necessary to obtain a piece of liver or beef kidney from the meat market and put the different electrodes on it to find where to set the machine before I put it on the patient. I think that is a point we should pay attention to before starting to use a machine we are not familiar with.

Robert A. Scarborough (closing): In regard to colotomy for a single polyp we believe that the preoperative preparation for such an operation should be equal to that for resection of a carcinoma since we are never certain before operation whether or not such a resection will be necessary. We always have a pathologist present in the operating room to observe the gross specimen and to make a frozen section diagnosis.

In regard to polyps that we think are malignant but which have pedicles which show no involvement I should like to repeat that we have had four patients in whom such polyps, with at least 2 to 4 cm. of uninvolved pedicle, had regional lymph node metastases.

In regard to colectomy I agree with Dr. Cattell that removal of the entire colon is certainly the theoretically correct procedure. In a manner of our patients, however, there have not been many polyps in the rectum and if anastomosis is done by an end-to-end procedure between the ileum and the rectum not high up in the sigmoid it is possible to proctoscope the entire area of residual rectum, in fact, to pass the proctoscope on into the ileum. If these patients are carefully followed, I believe that further development of polyps can be controlled in probably most of them without development of malignancy.

In regard to the argument between the snare and the diathermy ball tip certainly both instruments are of value, and their usefulness depends upon the experience of the individual using them. However, my vote must go with Dr. Binkley and the diathermy snare and my decision is weighted principally by the fact that ideally every bit of adenomatous tissue removed from the rectum should be examined microscopically for malignancy, and in the destruction by diathermy microscopic examination is not possible.

Richard B. Cattell (closing): I wish to congratulate Dr. Helwig on his presentation. He has studied the problem of malignant degeneration in polyps over a long period of time and his work and the work of others is the basis for the treatment of polyps at present.

I appreciated Dr. Dixon's emphasis on the importance of malignant degeneration in inflammatory diseases of the colon. In long-standing cases of ulcerative colitis at the Mayo Clinic they have reported a large series of cases which I think probably exceeds seventy-five patients who have had malignant degeneration. We have had nineteen and the results of treatment in our patients is even more disastrous than Dr. Dixon reported. We have two living of nineteen and in these two individuals the carcinoma was discovered by the pathologist at the time of total colectomy for other indications.

In all patients in whom malignancy was clinically proved death resulted from malignancy.

If we are to avoid this most serious complication occurring in patients with long-standing ulcerative colitis, the number of patients having total colectomy must be increased. Furthermore, any patient who has had ulcerative colitis who has had a clinical remission of symptoms and then begins to have rectal bleeding must be considered a carcinoma suspect.

I think it will take considerable courage for us, the surgeons, to continue to accept local excision of polyps by colotomy in light of the information which Dr. Scarborough has just presented. It is possible we will have to revise our opinion if others substantiate the presence of glandular involvement when the base of the polyp is free of malignancy. Thus far, we have not observed it and I do not believe it has been previously reported.

Relative to congenital adenomatous polyposis, I stated that the operation of choice is ileostomy followed by total colectomy, but I agree with Dr. Dixon and Dr. Scarborough that there are selected cases in which there are a limited number of polyps in the rectum that can be treated by fulguration, making it possible to do subtotal colectomy. These patients must be followed at least every six months for the duration of their life by sigmoidoscopy and fulguration of any polyps that are discovered.

In view of the frequency with which polyps are discovered in segments of the colon resected for carcinoma we must continue to be on the lookout for multiple lesions, both benign and malignant.

At a time when many more modified Mikulicz resections of the colon were done we frequently used sigmoidoscopic visualization, as mentioned by Dr. Binkley, in both proximal and distal ends of the projecting colostomy. Similarly, the instrument may be introduced into an end colostomy following abdominoperineal resection to rule out the presence of polyps of the colon.

Approximately 4 per cent of the patients who are operated upon for carcinoma of the colon or rectum in our clinic have two or more malignancies and we must continue to emphasize the possibility of this occurrence in order that a second malignant lesion will not be overlooked.

Case Reports

RETRORECTAL PARAGANGLIOMA WITH METASTASIS

VINCENT T. YOUNG, M.D.
Washington, D. C.

ACCORDING to Dr. Samuel P. Hicks, paraganglioma is a generic term applied to tumors of the paraganglions of the sympathetic and peripheral nervous system. Paraganglions are, like the sympathetic nervous system, derived from the embryonic neural crest. The best known paraganglions are the adrenal medulla and the carotid body, but similar chromaffinic tissue is found in association with other parts of the peripheral nervous system and in the form of enterochromaffin cells in the intestinal and bronchial epithelium. The best known paraganglioma is the carcinoid while much less frequently encountered tumors are the carotid body tumor and the pheochromocytoma of the adrenal medulla. Paragangliomas may arise anywhere in the peripheral nervous system but aside from the carcinoid of the gut they are rare. In general these tumors tend to remain benign but malignant forms occur with metastases. It is probable that the tumor described herein originated in the anococcygeal body.

CASE REPORT

E. G. G., a thirty year old male veteran, was admitted to the hospital on January 12, 1946, complaining of severe pain in the lower rectum and coccygeal region. He traced his first symptoms back to 1935 when he had a minor fall on the sacrococcygeal area following which he suffered sharp pain in that region for a week. This subsided without incident. Six months later he became conscious of a dull ache in the vicinity of the coccyx, a sensation of fullness in the rectum and a feeling of incomplete evacuation. Several months following the onset of these symptoms the pain suddenly became so excruciating that it was necessary for the patient to go to bed. A physician examined him at that time but nothing was found to explain the pain. After a week the severe pain subsided and only the dull ache and sensation of rectal fullness remained. From this time exacerbations of intense pain would occur once every three to six months. During several of these episodes physicians were consulted but no physical findings were revealed to explain the symptoms. When the patient entered the armed forces in July, 1942, no physical disabilities were noted on the induction examination. While in the service the symptoms increased in severity and the exacerbations of acute pain became more frequent so that it was necessary for the patient to be placed on the sicklist on numerous occasions. Cause for his complaints was not found during these periods of hospitalization. When he was discharged from the Army on November 4, 1945, no physical disabilities were noted. Two months later, January 10, 1946, a civilian physician was consulted during another bout of pain and on digital examination a large mass was found bulging into the rectum (digital examination had not been performed previously). There was no loss of weight or bloody stools. Family history was negative for tumors. A complete systemic inquiry did not contribute anything of further interest.

The patient, a slender, white male, gave the appearance of suffering acute pain. On admission his temperature was 99.2°F., pulse 88 and respiration 20. Digital examination revealed a large mass bulging into the rectum posteriorly which extended to the external sphincter below and followed the curve of the sacrum higher than the finger could reach. The mass was hard and firmly fixed. No fluctuation could be elicited. Proctoscopic examination showed the mucosa to be unbroken and normal in appearance. The sedimentation rate was moderately increased; blood and urine tests were within normal limits. X-ray examination did not reveal a tumor mass or evidence of bone destruction. A complete physical examination was negative. The impression at that time was that the patient was suffering from a retrorectal teratoma.

On January 18, 1946, an operation was performed under spinal anesthesia. The coccyx was removed through a posterior incision. A large hard, fixed mass was found which bulged into the rectum anteriorly. Laterally, it completely occluded both ischiorectal fossae. Below, it extended

to the external sphincter muscle. Above, the mass followed the curve of the sacrum for 10 cm. The tumor was freed with difficulty from the surrounding tissues to which it was densely adherent. It was necessary to resect a small portion of the posterior wall of the rectum about an inch and a half above the external sphincter muscle because the tumor could not be dissected free at that point. The bowel was closed and the wound packed open.

The pathologic examination was performed by Dr. Samuel P. Hicks who reported the following: The tumor was an encapsulated, round mass of firm tissue about 9 cm. in diameter in the fresh state. On section it was fairly homogeneous being composed of ill defined masses of pale brown tissue in a fibrous matrix.

The tumor was composed of islands of small, closely packed epithelial cells embedded in connective tissue. These cells, whose cytoplasm showed an affinity for potassium bichromate, were rarely arranged in acinar formation, usually appeared in sheets and tended to be radially pallisaded at the peripheries of the islands. The nuclei and cytoplasm were fairly uniform. Histologically, the tumor appeared benign. The diagnosis was paraganglioma.

The postoperative course was somewhat complicated by a breakdown of the bowel repair. However, after three months the fistula had healed spontaneously and without further incident. Four months following operation the patient was enjoying complete freedom from his symptoms and weighed 20 pounds more than his best previous weight. On May 20, 1946, he suddenly developed an acute suppurative pylephlebitis. The origin of this is obscure but was thought to be on the basis of a pelvic phlebitis. The patient recovered following a stormy course which lasted a month and a half. He continued in good health until November, 1946, when he first noted swelling and pain in the lumbar region. Shortly thereafter pain began to radiate down both legs and became progressively worse. X-rays of the spine showed an area of rarefaction in the third lumbar vertebra. Pantopaque studies revealed obstruction between the third and fourth lumbar segments. Reflexes of the lower extremities were diminished, sensation was gradually lost and the legs became paralyzed. On March 18, 1947, a laminectomy was performed and a small extradural tumor involving the third lumbar segment was removed. Pathologic examination of the specimen showed a histologic picture similar to that previously described.

Following this operation all symptoms rapidly cleared up and only slight numbness of the right leg remained. However, after two weeks the same symptoms gradually began to reappear and became increasingly worse until complete paralysis of the lower extremities again resulted. Further study revealed a cord compression in the thoracic region. On April 19, 1947, a second laminectomy was performed and a small extradural tumor was found compressing the cord at the seventh thoracic level. This also presented a microscopic picture similar to that of the original tumor.

The patient made an excellent recovery from this operation and remained well until December, 1947, when he again presented signs and symptoms of cord compression. On January 19, 1948, a small growth was removed from the second and third lumbar segments which was assumed to be a recurrence of the tumor previously removed from this region.

SUMMARY

1. A case of retrorectal paraganglioma with metastases has been presented.

2. It is probable that this tumor originated in the anococcygeal body.

3. A search through the literature did not reveal a similar case.

ANOMALOUS DEVELOPMENT OF ANAL PAPILLAE

HERBERT I. KALLET, M.D.
Detroit, Michigan

ALTHOUGH many types of congenital malformations of the anus and rectum have been described, there has been no mention of anomalous development of anal papillae. During the past two years I have observed eight children in whom this type of maldevelopment was present.

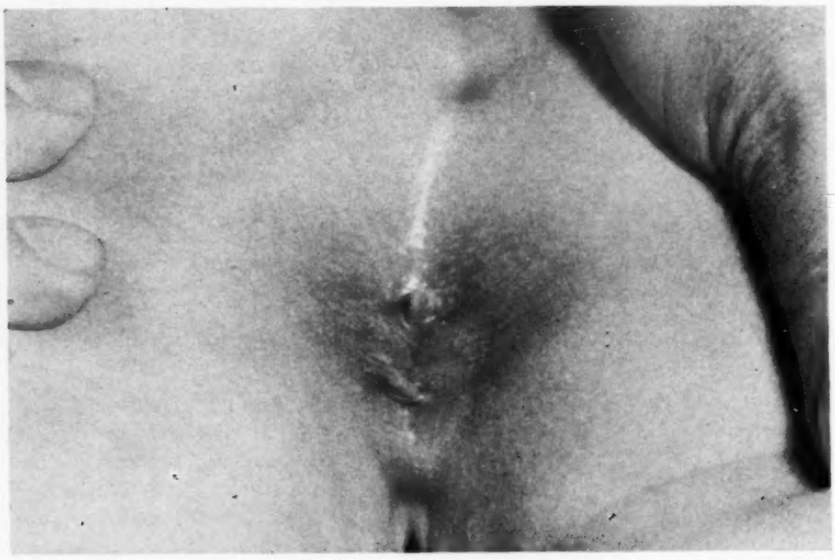


FIG. 1. Girl, eight years of age with two abnormally developed anal papillae.

In the early embryo the primitive hind gut is separated from the proctodeum by the anal plate. At about the fifth or sixth week an opening becomes established. The orifice is not developed as a circular stoma but as an invagination of irregular interdigitating epithelial-like folds. These folds are the anlages of the anal papillae and valves of Morgagni.

During the normal course of development this invaginating process takes place in a cephalad direction so that the papillae and valves become situated within the anal canal. Occasionally, however, the embryologic mechanism becomes disturbed so that one or more of these papillae develop in a reverse or caudad direction. The anomalous papillae thus become exteriorized and appear as small, rounded, firm projections at the anal orifice. Usually they are polypoid in shape but they may at times assume a transverse cylindrical form. It may also happen that in addition to the papillary abnormality, congenital fibrous bands at the anterior or posterior commissure may be present, producing some degree of anal stenosis.

The anomalous exteriorized papillae at first produce no symptoms. Owing to trauma caused by defecation ulceration tends to develop at the base of the protrusion and causes pain when the bowels move. Discomfort is increased if fibrosis has narrowed the anal orifice.

The clinical history follows a typical pattern. In early infancy the mother notices a small, fleshy tab in or near the anus. Often the baby cries during defecation and a drop of blood may appear on the stool.

Of the eight cases observed five were males and three females. One child was eight years old. The others were infants in the first few months of life. Two patients also had congenital fibrotic bands located at the posterior commissure. Ulceration at the base of an anomalous papilla was present in five cases.

The treatment for this malformation is essentially surgical. The child is given a general anesthetic, usually open cone ether. It is then placed crosswise on the operating table and a nurse or attendant holds the feet back so as to place the infant in a lithotomy position. The field is prepared by washing with alcohol only.

The baby's skin is very sensitive and a dermatitis may be produced by the stronger antiseptics. The anomalous papilla is grasped by a small forceps and a ligature of No. 00 plain catgut is placed above its attachment to the mucosa. The papilla is dissected free, the incisions being carried to the external skin for drainage. The rent in the mucosa is then sutured with fine catgut but the skin wound is left open. If a congenital fibrous band is present, this also is incised. A pressure dressing is strapped in place with adhesive.

The postoperative management is simple. The child is given its usual formula or diet. The wounds are washed with boric acid solution after defecation and a piece of gauze saturated with vaseline is placed under the diaper.

While the operation may be performed on patients of any age, it is advisable to wait until the child is at least four months old if possible. All of the patients in our series made good surgical recoveries and required only two or three days of hospitalization.

What the prognosis would be if the condition is left untreated I do not know. However, it is not uncommon to meet adult patients who date rectal symptoms back to childhood. Often these persons have anal tags and prolapsing papillae which may have originated as an anomaly similar to that which I have described. That this end result may take place is suggested by one case in our series. The mother of this patient had observed the presence of two anal tabs at infancy but delayed operation until the child was eight years of age. On examination then one papilla about 1 cm. in length was noted which protruded at the right posterior quadrant. There was also an anal tag at the anterior commissure above which was a small, rounded ulcer. Obviously the condition had not corrected itself spontaneously and untreated would probably have persisted to adult life.

CONCLUSIONS

1. Anomalous development of one or more anal papillae may occur.
2. This condition manifests itself by exteriorization of the malformed papilla.
3. Ulceration may take place at the base of the papilla and produce symptoms.
4. Excision of the abnormal papillae is indicated.

RECTAL CALCULUS OF UNUSUAL SIZE

GEORGE L. BECKER, M.D.
Paterson, New Jersey

FOREIGN bodies formed within the intestinal tract are comparatively rare. They are usually single and small but they may become enormous (23 cm. in circumference).[1] They usually form around a nucleus such as a gallstone, fruit stone, hardened vegetable matter or fecaliths. They are known as enteroliths or coproliths according to whether they are formed in the large or small bowel.[2]

Chemical stones result from the prolonged ingestion of mineral drugs used for indigestion such as bicarbonate of soda, bismuth, salol, calcium and magnesium carbonate and other such drugs.

Predisposing factors are a sluggish intestinal tract, constipation, defective innervation of the bowel wall or a weakness of the intestinal musculature and a sedentary life.

CASE REPORT

A woman, seventy-seven years of age, with complaints of rectal pain associated with prolapsed hemorrhoids, diarrhea, and rectal incontinence was seen. One week previous to this attack of rectal pain the patient had suffered from gastroenteritis lasting two days with severe cramps and profuse diarrhea. After the cramps and diarrhea had subsided it was observed that a lump which was always present in the right side of the abdomen had disappeared.

The patient's past history included a gallbladder operation in 1907, hypertension since 1923 and a cerebral accident in 1925 which resulted in complete permanent right sided spastic paralysis. At the time of the cerebral accident it was discovered that the patient had diabetes. She had been suffering for many years from indigestion, gas and dizzy spells with attacks of diarrhea for which she took bicarbonate of soda and charcoal antacid tablets which produced very little relief of the digestive symptoms.

Examination revealed a distended urinary bladder. One thousand cc. of urine were removed by catheterization following which the urinary output was normal for two days. Then the bladder became distended and the patient was unable to void. Catheterization revealed that the urinary bladder was full of bloody urine containing many clots. Tidal drainage of the urinary bladder was started. It was necessary to irrigate the catheter with a syringe every hour to remove the blood clots which interfered with the normal function of the tidal drain. Rectal examination revealed a corona of prolapsed edematous internal hemorrhoids. Digital examination revealed a hard irregular mass with many sharp spurs about the size of a tennis ball. The mass was movable within a dilated voluminous rectum which bled easily. A satisfactory sigmoidoscopy was not possible.

Laboratory findings were: urinalysis, acid reaction; specific gravity, 1.010; albumin, two plus; sugar, slight trace; acetone, negative; indican, negative; microscopic examination, masses of pus cells, red blood cells and epithelial cells. Blood chemistry: urea nitrogen, 18 mg. per 100 cc. of blood; uric acid, 1.7 mg. per 100 cc. of blood; creatinin, 1.1 mg. per 100 cc. of blood; sugar, 296 mg. per 100 cc. of blood; chlorides, 480 mg. per 100 cc. of blood; non-protein nitrogen, 37 mg. per 100 cc. of blood; calcium, 14.65 mg. per 100 cc. of blood; alkaline phosphates, 5.3 Babinsky units. The blood pressure was systolic 230, diastolic 130.

Roentgenogram of the abdomen (scout film) revealed a marked distention of the jejunum, ilium, ascending and transverse colon and a marked distention of the descending and sigmoid portion. A calculus, irregular in contour and approximately 7½ by 8½ cm. occupied the rectum. The calculus had a central nucleus appearing to be more densely calcified. There was noticeable calcification within the walls of the abdominal aorta. (Figs. 1 and 2.)

Under low spinal anesthesia a posterior proctotomy was performed in order to reach the stone which had gravitated up to the rectosigmoid junction just beyond reach of a hand placed in the vagina. The stone was grasped by one of its spur-like projections and a pair of sponge forceps was used to draw it down within reach of the hand in the vagina. An attempt was made to crush the stone but it was too dense and hard. All the usual grasping forceps available were too small to grasp the stone. It was necessary, therefore, to apply a pair of low pelvic obstetrical forceps to deliver the stone through the anal outlet. The posterior proctotomy had to be enlarged sufficiently to allow forcible extraction. The proctotomy divided the entire internal and external sphincter muscle as well as the puborectal fibers of the levator. The cut muscle fibers were united with interrupted sutures of chromic catgut. Oxycel dressings were applied. The flat blades of the obstetrical forceps encased most of the sharp spurs which would have caused

FIG. 1. Illustration shows distention of large and small intestines; irregular calculus is within the rectum.

considerable laceration of the mucosa. Recovery was uneventful.

The patient was discharged from the hospital fifteen days postoperatively. She had good control of her bowels and developed several soft fecal impactions. All the previous symptoms, gas, indigestion, dizzy spells, abdominal pain and diarrhea disappeared; her blood pressure was 190 systolic and 110 diastolic. The patient recovered sufficiently to be allowed out-of-doors each day and was able to enjoy automobile rides.

The gross pathologic specimen consisted of a hard, round, black, calcareous structure, 6 cm. in diameter and 23 cm. in circumference the surface of which was studded with projections of the same material, some reaching a length of 1 cm. The mass weighed 125 Gm. Pathologic diagnosis was intestinal stone.

COMMENTS

The stone originated in the cecum around a gallstone nucleus; its unusual size is probably

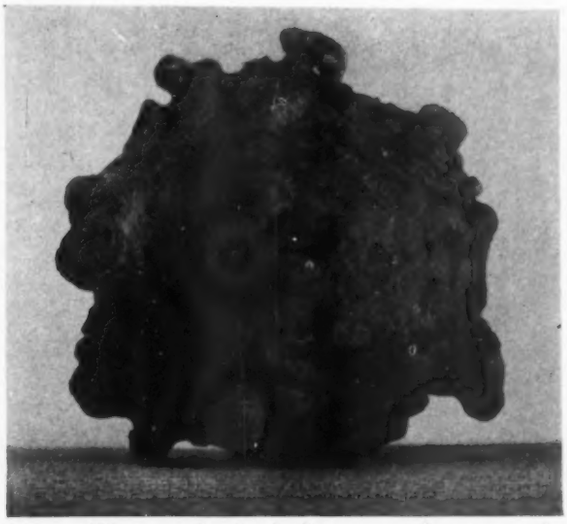


FIG. 2. Photograph of calculus, measuring 23 cm. in circumference, showing unusual formation with many irregular-shaped projections.

accounted for by the prolonged habitual use of alkaline medication. As shown by the x-ray (scout film of the abdomen) the enormous size of the stone caused an obstruction of the terminal portion of the colon. Reflexly the obstruction was the cause of indigestion, gas and abdominal pain. Acute urinary retention and hematuria were caused by the pressure of the stone on the urinary bladder.

Small low pelvic obstetrical forceps were a valuable aid in recovery of the foreign body. Its blades were easy to apply and adjust. The stone was firmly grasped and most of its sharp projections were covered by the blades, thus protecting the rectal mucosa from undue trauma while the stone was extracted by traction through a posterior proctotomy.

REFERENCES

1. YEOMANS, FRANK. Proctology. P. 628. New York, 1929. D. Appleton & Company.
2. BACON, HARRY. Anus, Rectum, Sigmoid, Colon, Diagnosis and Treatment. P. 797. Philadelphia, 1938. J. B. Lippincott Company.

Papers Read by Title

CHRONIC BURROWING ULCERATION OF THE PERINEUM DUE TO MICRO-AEROPHILIC HEMOLYTIC STREPTOCOCCUS*

JOHN CHELEDEN, M.D.
Philadelphia, Pennsylvania

CHRONIC, undermining, burrowing ulceration due to micro-aerophilic hemolytic streptococcus is now accepted as a clinical entity. Its mode of onset is understood, its bacterial etiology has been confirmed repeatedly and the characteristic appearance of the disease process after it has become established should be recognizable. The favorable influence of properly employed zinc peroxide on the course of the infection has been demonstrated.

Meleney in 1935 was the first to give a comprehensive report of this condition. Fortunately this type of chronic progressive ulceration of the skin is rare, but it is important because of the extent of its involvement of the body surfaces, its stubborn resistance to the usual forms of treatment and frequently fatal outcome.

The disease process may attack any part of the body and any person, regardless of age, sex or color. It usually occurs following incision of infected lymph nodes, in postoperative wounds, as contamination of traumatic wounds or a previously existing infection. The ulceration begins gradually in what appears to be an ordinary drainage tract from an abscess which may be superficial or deep. The skin margin becomes undermined by liquefaction of the subcutaneous fat and connective tissues. The skin edges become blue, but not gangrenous, and roll in. In other smaller areas the surrounding skin thins out, ulcerates and fuses with the original or mother ulcer. Ulceration and sinus formation vary depending upon the situation of the area of skin involvement. In the perineum where the skin is thick and resistant to necrosis, burrowing is greater, sinuses are more numerous and ulceration is limited. Muscle and bone are not often affected. Fever, pain and severe prostration are present in only a few cases. The etiologic agent is the micro-aerophillic hemolytic streptococcus, an organism which lies intermediately between the aerobic and anaerobic groups, preferring a reduced oxygen environment for further multiplication. Their immediate source is probably the intestinal tract or vagina. In many cases the organism can be obtained only by anaerobic cultivation and is therefore missed frequently when routine aerobic methods of culture are employed.

Treatment with ordinary antiseptics usually produces no permanent effect. The ulcer continues as an ordinary infection for a time and may show considerable improvement following any treatment. Ultimately, however, improvement ceases. The infectious process may remain stationary or become more extensive, never healing completely.

When properly applied, zinc peroxide controls the spread of infection. Under its influence the streptococci lose their anaerobic and later their hemolytic properties. The wounds heal and behave in much the same way as wounds infected by ordinary hemolytic streptococcus. The development of this therapeutic agent, its mode of preparation and technic of application are described best in early reports of Meleney and his co-workers.

There are three criteria for success in the use of zinc peroxide: (1) The chemical agent must be potent. (2) The freshly prepared creamy suspension in water must be in intimate contact with all parts of the infected surface. (3) The

* From the Jefferson Medical College Hospital, Department of Proctology, Division of Surgical A Service, Philadelphia, Pa.

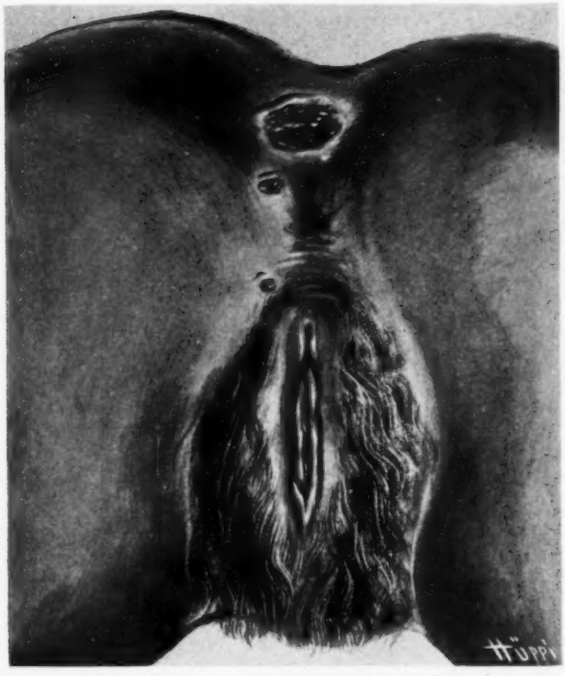


FIG. 1. Case I. Photograph of artist's drawing of spreading multiple ulcers of the perineum due to micro-aerophilic hemolytic streptococci three weeks after onset of disease.

dressing must be effectively protected against evaporation and drying.

Sulfanilamide administered by mouth has proved helpful in many cases. In a number of instances penicillin has been employed. Immediately following the first report of treatment with this antibiotic its use was thought to possess no value. Recent reports indicate that it has a beneficial effect when employed both parenterally and locally.

It is the purpose of this paper to report five cases which showed the typical clinical characteristics of chronic, undermining, burrowing ulceration due to micro-aerophilic hemolytic streptococci in which the patients were observed and treated on the proctologic service of The Jefferson Medical College Hospital and to re-affirm the favorable influence of zinc peroxide on the course of the infection. In addition, certain features in the diagnosis and management of this unusual condition as it pertains to proctology will be stressed.

A sixth case is included which exhibited all the clinical characteristics of this type of surgical infection and in which the patient improved following the use of zinc peroxide therapy. However, the anaerobic organism was never identified.

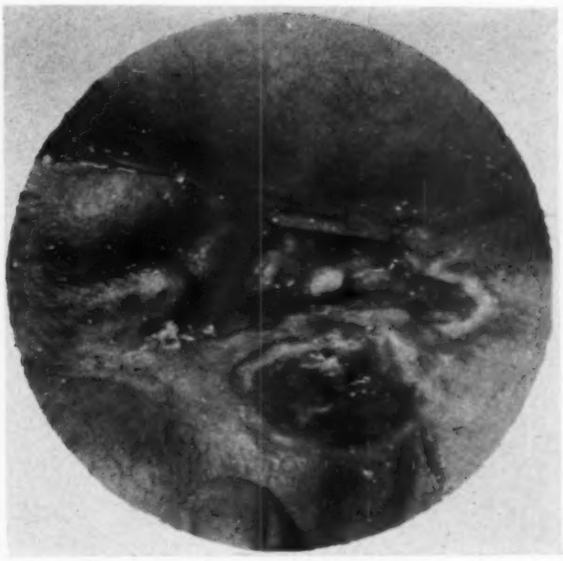


FIG. 2. Case II. Perineal ulceration seven years after onset of disease. Photograph taken at time of last admission. Note the undermined, rolled in skin edges, burrowing sinuses, with large daughter ulcers.

CASE REPORTS

CASE I. T. A., a colored female aged thirty-eight years, was admitted December 28, 1939, for study because of remittent fever, the etiology of which was unknown. After extensive studies a diagnosis of trichiniasis was made. On February 1, 1940, a small swelling developed over the posterior perianal area. This was painful and tender and after several days a superficial abscess developed which was allowed to rupture spontaneously. Several days later a similar abscess formed approximately 1 inch from the first lesion and closer to the anal opening. It was thought that an anal fistula had developed but examination failed to reveal any connection with the anal canal. A third area of ulceration developed over the sacral region. Routine treatment extending over a period of twelve days was ineffectual; in fact, the ulceration appeared to spread. (Fig. 1.) Anaerobic cultures were requested and the micro-aerophilic hemolytic streptococcus was found. A suspension of medicinal zinc peroxide in water was applied and what previously appeared to be chronic ulcerating, sluggish wounds now began to heal.

On March 1st there was a change of interns and because of this fact saline compresses were ordered to replace the zinc peroxide dressing. The ulceration then began to extend even further than when the patient was first seen. Three weeks later zinc peroxide therapy was resumed. The wound assumed its previous healthy appearance and healing was complete April 15, 1940. The patient was discharged April 30, 1940, and was seen six months

FIG. 3. Case II. Ulceration completely healed; same patient as in Figure 2.

FIG. 4. Case III. Roentgenogram following injection of radio-opaque medium into perirectal fistulous tract, showing penetration of tract into depth of pelvis.

later. Ulceration had not recurred during this period.

Comment. This case shows the ill effects of interrupting treatment too early.

CASE II. T. B., a white male aged twenty-five years, was first admitted on August 1, 1933, and at that time a diagnosis of perianal abscess and anal fistula was made. The patient was admitted to the hospital eight times during the period from August 1, 1933, to June 2, 1940, and an operation was performed each time. It was believed that the entire fistula had been excised at the time of the initial surgical procedure. The patient was then referred to the out-patient department for post-operative care. When it seemed that the wound had healed completely, swelling occurred at variable distances from the site of the original perianal abscess and another sinus developed. During each of the eight successive admissions to the hospital thorough debridement was performed. Following each operation, complications developed which were similar to those which followed the first admission.

Repeated studies were made to exclude actinomycosis, tuberculosis, syphilis, lymphogranuloma venereum and granuloma inguinale. Every conceivable antiseptic was used upon the chronic ulcerating areas without any beneficial effect. At times the perianal sinuses would appear to be almost completely healed, but soon they would break down, become undermined further as well as more extensive. (Fig. 2.)

On June 2, 1940, the last admission, cultures were made of the discharge from a deep perianal sinus and a pure growth of microaerophilic hemolytic streptococci was obtained. The sinuses

were then opened widely, as had been done on previous occasions, and zinc peroxide paste was applied twice daily. In the course of three weeks the wound had healed completely. There was no evidence of recurrence during the ensuing year. (Fig. 3.)

Comment. This case exemplifies the following factors: (1) routine cultures possessed little value; (2) loss of time for the patient was a serious problem (over one hundred days in the hospital); (3) wasted effort of the physician.

CASE III. J. W., a white male aged forty-six years, was admitted March 14, 1939, with a diagnosis of extensive anal fistula of ten years' duration.

The patient had been operated upon in 1929 for an ischorectal abscess and anal fistula. The wound failed to heal. A second operation was suggested by the attending physician but the patient refused. During the next ten years it was necessary for the patient to wear a dressing continuously because of profuse drainage from the perianal wound.

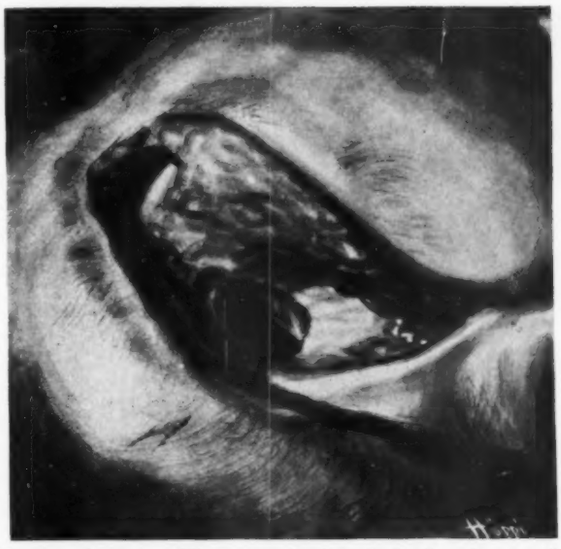


FIG. 5. Case III. Photograph of artist's drawing made following surgical exploration and excision of multiple fistulous tracts of the perineum and perirectal spaces. Micro-aerophilic hemolytic streptococci together with Bacillus Welchii were found in culture from this wound

FIG. 6. Case III. Showing complete healing of all perianal ulcerating areas twelve years after onset.

When the patient presented himself on March 14, 1939, nine external openings were found in the tissues adjacent to the anus. These sinuses communicated with each other and with three internal openings, one of which was in the anterior anal canal and another was approximately 2 inches above the anus and situated posteriorly. Studies were made in order to exclude actinomycosis, syphilis, lymphogranuloma venereum and granuloma inguinale. X-ray examination performed after a radio-opaque solution had been injected into the sinuses failed to reveal any connection between the sinuses and the bony structures. The presence of an intermittent fever was disclosed during the preoperative period.

On March 28, 1939, the fistulas were explored surgically. The great extent of the fistulas as indicated by x-ray studies (Fig. 4) was confirmed. Appropriate drainage was provided and after that the wound appeared to be healing satisfactorily except for the extension of ulceration and undermining in the anterior perianal area. (Fig. 5.) On May 2, 1939, the wounds were débrided again because of additional sinus formation and also to provide better drainage. At this time it was noted that the granulation tissues in the deep portion of

7

8

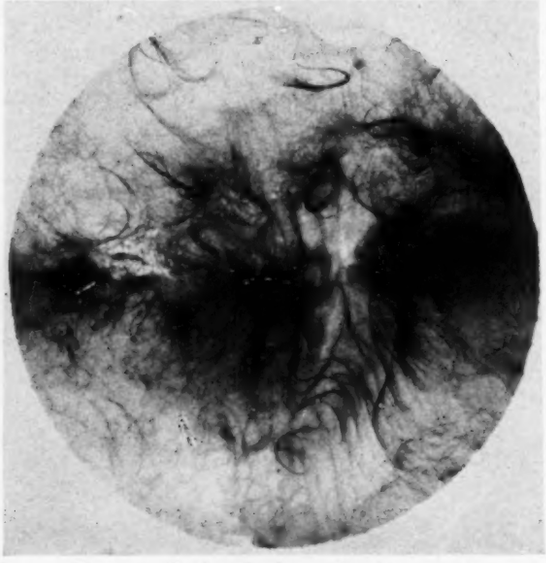


FIG. 7. Case IV. Perianal ulceration in a patient with ulcerative colitis three years after onset showing undermining. The base is composed of grayish, shaggy, gelatinous granulations.

FIG. 8. Case IV. Showing almost complete healing of the perianal ulceration; photograph taken one month after Figure 7.

the wounds appeared to be gray and shaggy. Fever rose to 103°F. and continued daily and the patient failed rapidly. Peritoneoscopy was performed in order to determine if there was a communication with the peritoneal cavity. None was found. At this time it was noted that the liver was firm, somewhat shrunken and slate-gray in color. Amyloid disease was suspected but was not confirmed. On August 3, 1939, the patient was discharged with a poor prognosis. The weight loss was 23 pounds during the four-month period of hospitalization. Dressings were continued in the out-patient department biweekly. Various antiseptics were used without beneficial effect. Weakness and fever continued.

On August 19, 1940, cultures were made from the discharge of the fistulous tracts and the perianal ulceration. Aerobic and anaerobic microaerophilic hemolytic streptococci were found. In addition, Bacillus Welchii were discovered. Zinc peroxide paste was then used and immediate improvement was seen, especially in the healing of the perianal sinuses. Difficulty was encountered in reaching the depths of the extensive wound. When the zinc peroxide was introduced it would dry quickly and cause pain. Sulfanilamide was given by mouth and a saturated solution of this agent was placed into the deeper portions of the wound. Applications of zinc peroxide were continued over the more superficial areas. The granulation tissue assumed a healthy appearance, the discharge decreased, the fever subsided and the patient gained weight rapidly. On December 5, 1940, the right side had healed and the depth of the cavity on the left side had decreased from approximately 5 or 6 inches to 2 inches. Cultures from the unhealed portion of the wound did not show either streptococci or B. Welchii. Zinc peroxide was discontinued in January, 1941, five and one-half months after its first application and at that time all the ulcerated areas had healed. (Fig. 6.)

Comment. (1) This case proves the extreme toxicity which accompanies this type of surgical infection; (2) without proper management it might have progressed to fatal outcome; (3) it serves to illustrate the difficulty experienced when treating deep cavities; (4) sulfanilamide employed locally and systemically was beneficial.

CASE IV. F. G., a white male aged twenty-five years, was admitted April 14, 1939, with a diagnosis of ulcerative colitis and multiple anal fistula of two years' duration. Extensive ulceration of the rectum and the lower portion of the sigmoid was present at the time of admission. A superficial anal fistula was situated posteriorly and there were several perianal sinuses. On April 28th the fistula and sinuses were excised. Attention was then directed toward treatment of the ulcerative colitis and the patient improved sufficiently to be discharged on September 15, 1939. Dressings of the perianal wounds were continued in the out-patient department.

On March 2, 1940, the patient was readmitted because of the development of additional perianal sinuses, with undermining of the old wounds. (Fig. 7.) These were opened widely, and again the patient received care in the out-patient department. Healing appeared to progress normally for several weeks, but after that the condition of the wound

FIG. 9. Case IV. Photograph taken six months after Figure 8.

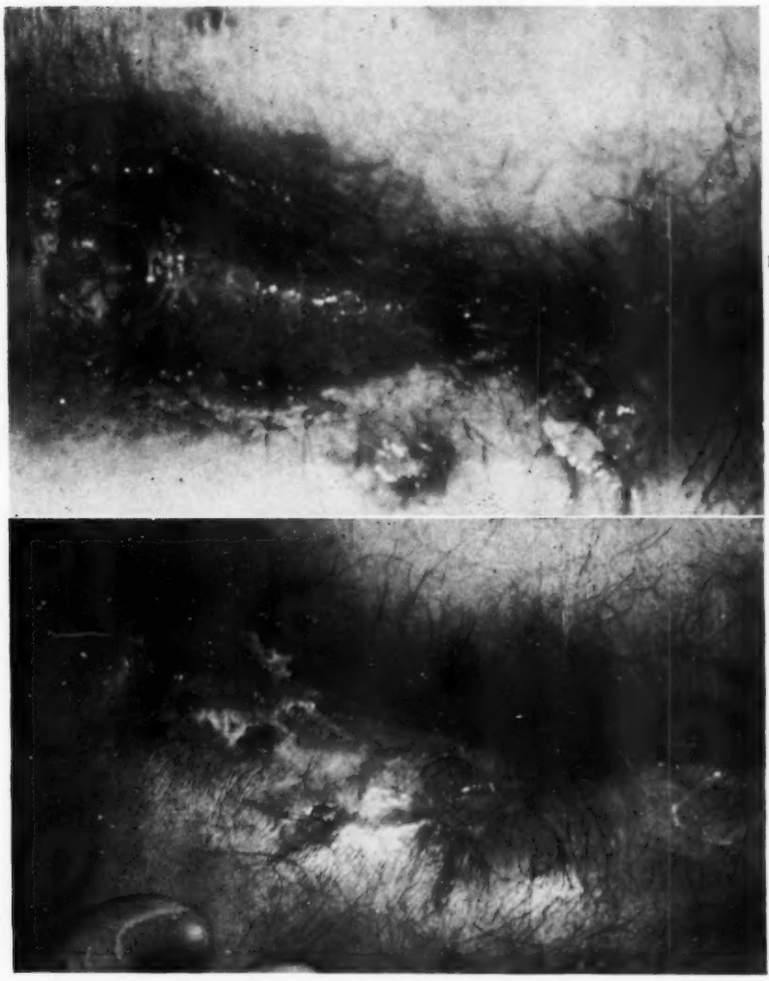
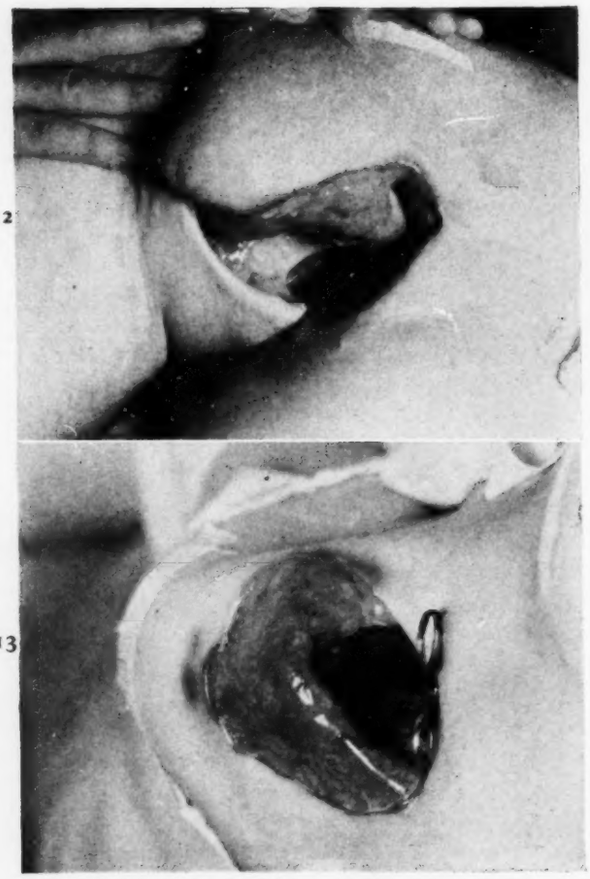


FIG. 10. Case V. Spreading perianal ulceration in a tuberculous ulcer from which anaerobic hemolytic streptococci were recovered. Note presence of daughter ulcer.

FIG. 11. Case V. One month following application of zinc peroxide. There is a definite attempt at healing. The daughter ulcer has healed completely; undermining is still present, however.



12

13

FIG. 12. Case v. Four and one-half years after onset of disease showing extensive ulceration of left perianal area and buttock beginning with development of abscess. Note rolled in skin edges and extensive burrowing.

FIG. 13. Case vi. Same patient as in Figure 12, showing extensive ulceration and cavitation over left iliac fossa. Note thinning and rolling of skin edges with bluish discoloration. A daughter ulcer is in process of formation. The proximal end of a Kelly hemostat protrudes from the depth of the ulcer.

did not improve. On June 5, 1940, cultures were made from the discharge of the sinuses and microaerophilic hemolytic streptococci were found. Dressings of zinc peroxide paste were started but little improvement was noted. On July 24, 1940, cultures were made from the bowel wall and studies for anaerobic organisms were requested. Microaerophilic hemolytic streptococci were found in this culture. Sulfanilamide was given by mouth. In addition a saturated solution of sulfanilamide was instilled into the rectum twice daily. Dressings containing zinc peroxide paste were continued. Following this, the perianal wounds and the appearance of the mucosa of the bowel improved steadily. (Fig. 8.) During the period of six months from December, 1940 to June, 1941 there was no recurrence of ulceration. (Fig. 9.)

CASE V. H. C., a white male aged fifty years, was admitted June 14, 1940, with a diagnosis of anal fistula. Prior to admission two fistulectomies, performed during a period of fourteen months, appeared to be unsuccessful.

Examination revealed an irregularly shaped ulcer which involved the posterior portion of the anal canal and extended into the perianal skin for a distance of 2½ inches. In addition, superficial chronic sinuses were present in the anterior portion of the anal canal.

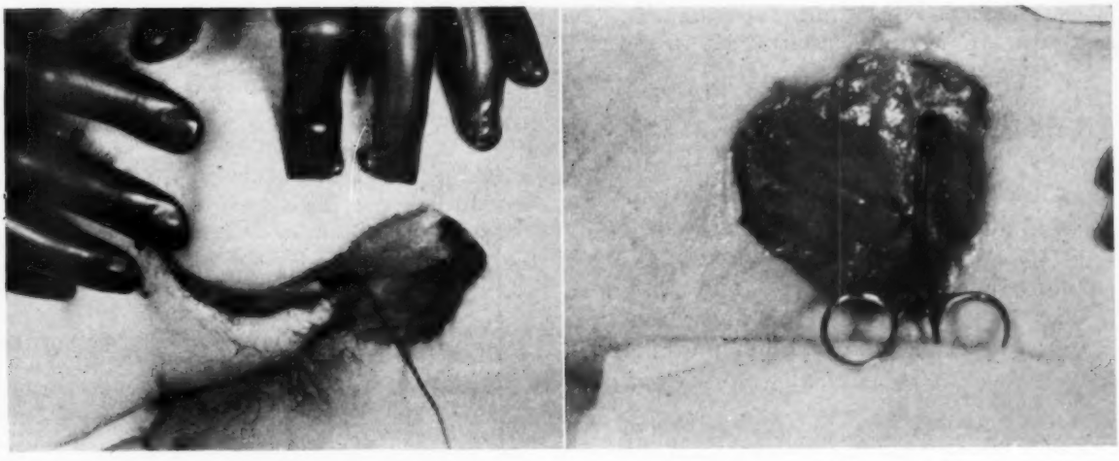
A biopsy of the ulcerating area showed definite tubercle formation. Lactic acid bacilli were recovered from cultures made routinely. Anaerobic cultures were requested and faculative anaerobic and aerobic gram-negative rods and hemolytic streptococci were found. A diagnosis of chronic bilateral fibro-exudative pulmonary tuberculosis was made following x-ray study of the chest.

On June 22, 1940, the ulcers were fulgurated. For several weeks afterwards the wound appeared to heal satisfactorily, and the patient was discharged with instructions to return to the out-patient department for dressings. Improvement was slow but steady for approximately eight months, but the ulcer never healed entirely. Once more the ulcer began to extend and the skin edges became undermined and rolled in. The base was yellow and contained grayish granulations and several daughter ulcers had developed in the adjacent areas. (Fig. 10.) The patient was readmitted to the hospital on March 7, 1941. Anaerobic cultures were made and the presence of anaerobic and aerobic bacilli coli communis, and streptococci non-hemolyticus was confirmed. Dressings containing zinc peroxide paste were applied to the ulcerating areas and they improved perceptibly. (Fig. 11.) The patient was sent to the out-patient department where he received dressings daily. Two months after the first application of zinc peroxide the ulcers were healed. The patient was then admitted to a tuberculosis sanitorium for treatment of pulmonary tuberculosis.

Comment. This is an example of the spread of a tuberculous ulcer which had been contaminated by anaerobic organisms.

CASE VI. L. L., a white female aged sixty-four years, was admitted October 30, 1947, with a diagnosis of chronic ulceration of the left perianal and left iliac areas.

Four and one-half years before admission an abscess developed on the left side of the anus. It was incised and drained and treated as an anal fistula. The wound failed to heal with routine treatment; in fact, it became more extensive. On March 12, 1945, a laparotomy was performed and a search was made for a fistulous opening high in the



14 15

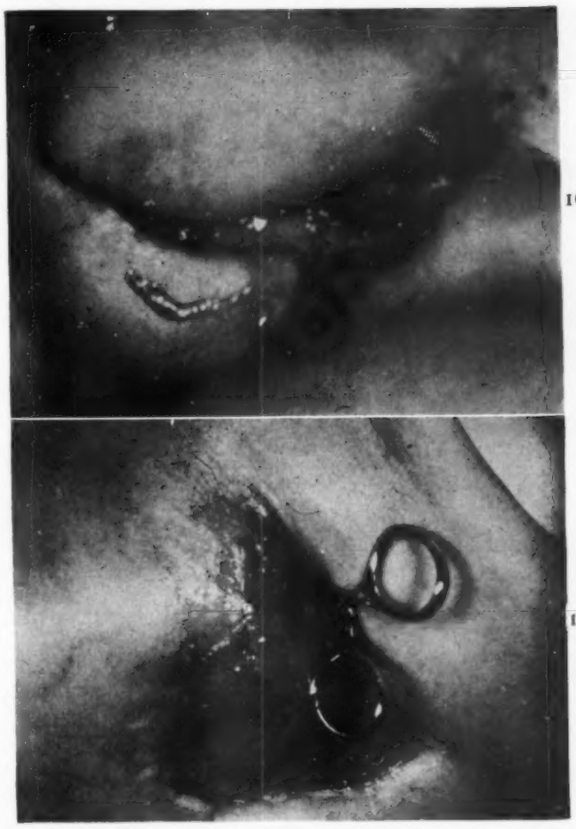
FIGS. 14 and 15. Case VI. Photographs taken four months after Figures 12 and 13, respectively.

rectum. None was found, but a colostomy was made to prevent contamination of the perianal wound by fecal material. The patient developed a deep abscess in the left iliac area. Subsequently, extensive ulceration similar to that which was present in the left perianal area involved the left lower abdominal wall.

The patient was a fairly well nourished, elderly female who obviously was suffering from pain. An extensive, deep ulcerating wound was present over the left perianal area and the buttocks on that side. (Fig. 12.) Another deep cavity was present in the left iliac area. A large fistulous opening extended into the distal loop of the sigmoidal portion of the colon where the ulcerating process had eroded. The surrounding skin was undermined and thinned out, the edges rolled in and there was bluish discoloration in some areas. (Fig. 13). Repeated studies were made for actinomycosis, syphilis, tuberculosis, lymphogranuloma venereum and granuloma inguinale, with negative results. Repeated study of the discharge showed staphylococcus, colon bacillus and occasional streptococcus hemolyticus. Anaerobic organisms were never found. The patient complained of severe pain, and the temperature rose to 102°F. There was moderate anemia; the blood chemistry findings were normal.

Repeated transfusions were administered. Zinc peroxide paste was packed into the deep cavities twice daily, and beginning November 11, 1947, penicillin was given in doses of 100,000 units every three hours. The ulcerating cavities gradually assumed a healthy appearance and there was a tendency to fill in. The patient was discharged two months later somewhat improved.

Applications of zinc peroxide paste were continued at home by the referring physician and the patient's husband. The patient was readmitted two and one-half months later for follow-up examination. There was marked general improvement; she had gained 6 pounds in weight and the fever had subsided. The large ulcerated areas had filled in to a great degree. (Figs. 14 and 15.) The fecal fistula, with internal opening into the sigmoid colon, had closed spontaneously. Treatment with zinc peroxide paste was continued at home. The patient was seen again six and ten months after the initial application of specific therapy. General improvement was noticeable with a weight gain of 35



16

17

FIGS. 16 and 17. Case VI. Photographs taken ten months after Figures 12 and 13, respectively, showing the slow but progressive improvement.

pounds. The improvement in the appearance of the ulcerated areas was considerable. (Figs. 16 and 17.)

SUMMARY AND CONCLUSION

Five case abstracts are presented which afford typical illustrations of chronic, undermining, burrowing ulceration caused by micro-aerophilic hemolytic streptococcus. Although the sixth patient exhibited all the clinical characteristics of the disease, including improvement following use of zinc peroxide therapy, the micro-aerophilic hemolytic streptococcus was never isolated despite repeated attempts.

The proximity of these wounds to the intestinal tract was evidently a contributory factor in the development of this type of infection.

It is surprising that in only one instance was the disease suspected early in its course. After many forms of treatment had failed actinomycosis, syphilis, tuberculosis, lymphogranuloma venereum and granuloma inguinale were usually suspected.

The fifth case illustrates the spread of ulceration of a recognized tuberculous ulcer due to contamination by secondary anaerobic organisms.

The importance of early diagnosis, recognition of the clinical manifestations and isolation of the causative organisms by securing anaerobic as well as aerobic cultures is stressed.

The efficacy of properly employed zinc peroxide therapy, as observed by Meleney, is confirmed. Strict adherence to all the details in the application of zinc peroxide paste and continuance of this treatment until healing is complete is necessary if success is to be accomplished.

REFERENCES

1. Gius, J. A. Zinc peroxide in treatment of surgical infections. *Northwest Med.*, 39: 354, 1940.
2. Lawrence, K. B. Sulfanilamide therapy in chronic undermining ulcer. *New England J. Med.*, 222: 573–575, 1940.
3. Leacock, A. A case of chronic undermining ulceration treated with penicillin. *Brit. Med., J.*, 1: 765, 1945.
4. Meleney, F. L. Zinc peroxide in the treatment of micro-aerophilic and anaerobic infections. *Ann. Surg.*, 101: 997–1011, 1935.
5. Meleney, F. L. In Christopher's Text Book of Surgery. Philadelphia, 1945. W. B. Saunders Co.
6. Meleney, F. L. Further laboratory and clinical experience in the treatment of chronic undermining burrowing ulcers with zinc peroxide. *Surgery*, 1: 169–224, 1937.
7. Meleney, F. L. Prophylactic and active treatment of surgical infections with zinc peroxide. *Surg., Gynec. & Obst.*, 64: 387–392, 1937.
8. Meleney, F. L., Friedman, S. T. and Harvey, H. D. The treatment of progressive bacterial synergistic gangrene with penicillin. *Surgery*, 18: 423–435, 1945.

PRURITUS ANI

A STUDY OF RESULTS WITH GENTIAN VIOLET IN 210 CASES

JAMES T. JENKINS, M.D.
Peoria, Illinois

GENTIAN violet was first used in the United States by Faust in 1930 as an anthelmintic. It was the first effective drug therapy against Strongyloides stercoralis. Later the dye was found to be the most effective anthelmintic for treatment of oxyuris vermicularis.

The antiseptic dyes have a marked specificity of action which seemingly is related to the staining properties of bacteria. The staining properties in turn are dependent upon physicochemical characteristics of the constituents of the bacterial cells. Therefore, it is believed that the bactericidal action of the antiseptic dyes is closely related to the physicochemical properties of the compounds. Antiseptic dyes can be divided into two groups depending upon whether the color-producing radical is electropositive or electronegative. The electropositive dyes have a special affinity for gram-positive organisms, are more effective in a basic medium and are called the basic dyes. This does not mean that the compounds themselves are basic but rather they have an affinity for chemically basic groups. The acid dyes are active against gram-negative organisms and act best in an acid medium. Other factors than type of organism and pH also influence the activity of germicidal dyes. Their antiseptic properties are greatly diminished in the presence of serum or other organic material. Temperatures higher than that of the body also decrease their effectiveness.

All the antiseptic dyes are toxic to tissue cells as well as to micro-organisms. In the case of some compounds the sensitivity of host cells is greater than that of the parasite. However, many of the dyes have a high therapeutic index and several are effective even after intravenous administration.

The triphenylmethane or rosaniline dyes are a group of basic dyes which are effective germicides against gram-positive organisms. The group includes gentian violet, crystal violet, methyl violet, brilliant green and acid and basic fuchsin. The first four are used medicinally. The rosaniline dyes are bactericidal to gram-positive micro-organisms in dilutions of approximately 1:1,000,000. They are particularly effective against staphylococci, B. diphtheriae and B. pyocyaneus. Also the causative organism of Vincent's angina and many strains of monilia (fungus), torula (yeasts), epidermophyton and tricophyton are susceptible to this group of dyes. Gentian violet is also an effective anthelmintic. The gram-negative bacteria are very resistant to the rosaniline dyes.

PRURITUS ANI—A SYMPTOM OR A DISEASE

From the literature it seems agreed that from 60 per cent more or less of the cases of pruritus ani have a dermatologic condition caused by fungi and/or a secondary infection. An anorectal disorder is an exciting cause; crypts, anal glands, ulcers, fistulas and vaginal discharges are predisposing causes, preparing the skin for the invasion and the secondary changes such as edematous thickening of the skin, vesicles, excoriation, maceration, radial fissuring, fibrosis, etc.

Any existing condition responsible for perianal moisture may prepare the field for secondary invasion. On the contrary, there are numerous patients with prolapsed internal and external hemorrhoids with continuous moisture and no pruritus ani. One patient was seen with complete prolapse of the rectum and no pruritus ani. Itching associated with or initiated by a bowel movement is frequently caused by a fissure or anal ulcer, deep crypt or prolapsing hypertrophied papillae.

After reviewing the voluminous literature which lists as exciting causes all parts of the body from the scalp to the feet and only twice referring to the colon as a site for the exciting cause, we believed there might be something here which has not received deserving consideration.

We found the most common invader of the intestinal tract in man to be the oxyuris vermicularis. Leuchart in 1876 said, "There may be only a few who do not harbor oxyuris vermicularis at one time or another." The United States Medical Corps in 1944 in a

survey of 2,900 white adults and children found that 41 per cent gave positive tests. Sick of Michigan reports 20 per cent or more were found to harbor this infection. Miller of Gorges Hospital in the Canal Zone, in 1944, reported that in 20 per cent of thirty-five appendectomies, the appendix contained pinworms. He also reported that members of the white race were more susceptible than the colored. Peterson at Minnesota State Hospital in 1942 reported that 59 per cent of 1,871 patients gave positive tests.

Lane in *The Lancet* in 1944 reported no experimental animal is known in which oxyuris vermicularis will develop. The life of this parasite in guinea pigs, mice, cats, dogs or monkeys has been unknown even after attempts to lessen the resistance of the hosts. The horse, I understand, is subject to infestation and life of the oxyuris.

The life of pinworms is spent usually in the ileum and the cecum. The translucent female parasite about to give birth to young reaches the rectum at certain hours, usually at night, passes out through the anus, travels to the perianal skin and clothing and deposits from 10,000 to 20,000 eggs, after which she becomes opaque and dies. The male dies in the right colon after fertilization of the female. Few eggs survive forty-eight hours and none survives ninety-six.

There is a gap in the life history. It covers the period from the time at which the egg either reaches the nose (from which Lentze, in 1935, recovered it) or is more directly swallowed, and that at which the worm reaches the rectum. Since the female threadworm rarely oviposits before leaving the bowel, microscopic examination of the stool for eggs cannot determine their presence. So Hall devised the N.I.H. swab, cellophane tape, glass rods, etc., which may reveal the presence of eggs in the uncleaned and untreated individual. Brown reports that six weeks after ingestion of the ova the gravid female migrates out of the anal canal. Leuchart reports eggs swallowed are mature worms in from fifteen to twenty-eight days.

Cram in Medical Annals of the District of Columbia writes that of all the helminths which parasitize man, the pinworm is more intimately associated with man throughout its life history than is any other species. The pinworm is the only intestinal parasite not requiring an intermediate host. Consequently, we may consider as unique the manner in which the eggs of the pinworm are disseminated and infection acquired. The migration of the pinworm through the anus, the deposition of its eggs on the skin in the perianal region and in the vagina of females, the development of its eggs to infectivity within six hours under the conditions of temperature and humidity which are present in these regions are factors that facilitate re-infection of an individual.

The sensitivity of man to pinworms varies greatly. Some individuals get a terrific reaction varying from nausea and vomiting, abdominal pains and cramps, diarrhea with mucus and blood with marked perianal inflammation, to no evidence at all except pruritus ani. Some have mild abdominal symptoms and no pruritus ani while others have no symptoms at all but may discover a worm. One male patient, aged forty-two, stated that he had seen worms with each bowel movement since childhood.

In this study made in the past two years of over 200 patients whose chief complaint was pruritus ani, 70 per cent of them stated that itching occurred only after retiring at night or was greatly aggravated at that time. Our practice for the past six years to apply a 3 per cent gentian violet paste to the anal canal and perianal areas following the anorectal examination was routine; hence, we were surprised to find invariably from patients with pruritus ani that they were able to sleep undisturbed for the three succeeding nights following the examination, after which time some pruritus returned and the patient returned requesting more of the same treatment. Our interest was greatly aroused as to the reason for this marked relief from itching, as usually the perianal area would show considerable improvement. Since this study was begun two years ago, we have actually found worms in only ten of more than 200 patients, all of whom have had anoscopic, proctoscopic and sigmoidoscopic examinations. All female patients have had pelvic examinations including bimanual and catheterized specimens of urine. No stool examinations were made and few attempts to find the ova were made as these were all unsuccessful except one in which a female worm was found depositing her eggs. This was a male child aged fifteen months.

TREATMENT

In the past two years, all patients with pruritus ani are placed on the same regimen,

with the objective being to eliminate the pruritus before any other procedure is instituted regardless of the condition. All patients are seen twice weekly at which time the perianal area is painted with a generous amount of gentian violet compound. This preparation contains gentian violet 3 per cent, tannic acid 10 per cent and 1 per cent pontocaine. This medication is to be left on until the morning bowel movement after which the area is to be washed with cotton and water and then dried. A thin application of an ointment containing one part of salicylic acid to two parts of benzoic acid in petrolatum is applied to the perianal area. Before retiring the area is again washed with cotton and water, then dried and the ointment applied. A thin layer of cotton separates the buttocks.

Orally, the individual is given enteric coated tablets of gentian violet three times daily before meals, the dosage varying from $\frac{3}{20}$ gr. to 1 gr. This is to be continued for eight days followed by an eight-day rest and a repetition of the eight-day oral intake of gentian violet tablets. Cleanliness must be continued and no soap is used. Constipation, when it existed, was corrected by the use of bulk, sufficient fluid intake for normal body chemistry and large doses of vitamin B compules with C, when bulk and fluids were not sufficient to correct this bad habit. Mineral oil was never used and those patients using mineral oil were changed to the bulk, thereby making cleansing of the perianal area much easier.

In every case except six of the 210 included in this study, the itching was eliminated at night and sleep was undisturbed. Two of these six cases were secondary syphilitic ulcerations and were not affected by the gentian violet therapy, but were cured by specific treatment. The other four were failures and the patients failed to return after the gentian violet therapy.

Of the 210 cases under study 136 were apparently cured from medical management alone. The perianal skin had returned to normal and the patient remained symptom-free. Sixty of the patients had subsequent injection of the internal hemorrhoids and another fifty-one were operated upon for anorectal disturbances after their symptoms had subsided. Seventeen were operated upon as the pruritus persisted intermittently but these people were all bothered with itching only in the daytime.

There were twenty recurrences within three months after discharge as cured. Twelve had had surgery and eight only medical management. These responded to medical treatment and were discharged after their second round of oral therapy, the early response in the recurrences being due to lack of secondary involvement of anal and perianal skin.

In addition to the previously mentioned hemorrhoids, other forms of disorders encountered included thirteen adenomas, one of which was malignant; eight anal ulcers; seven fissures; seven crypts; seven fistulas; two anal glands; three ulcerative colitis; four condylomas; three trichamonas vaginalis; three vulvovaginitis with perianal excoriation which all cleared up completely. One female who two years previously had had a vulvectomy for pruritus ani and vulvae had a recurrence of the same severity which cleared up completely with gentian violet medication. Six patients had had previous x-ray therapy with recurrence in from three to eight months and were cleared up completely with the gentian violet treatment. Four patients had had clover-leaf or Ball operations elsewhere for pruritus ani with return of the symptoms within three months; gentian violet therapy completely relieved them of all symptoms and there has been no recurrence in the past year in any of them.

SUMMARY AND CONCLUSIONS

This study covers too small a group and over too short a period of time for definite conclusions. Gentian violet orally and locally seems to have a definite place in the complete relief of nocturnal symptoms in those not completely cured. The incorporation of additional medicaments may be of value, especially one which is bactericidal to gram-negative bacteria. Other fungicides are unquestionably of value in alleviating the secondary skin invasions.

Gastrointestinal reactions occurred in approximately one-third of all 210 patients taking gentian violet medication. Reactions varied in severity from mild nausea and abdominal discomfort to vomiting with cramps and diarrhea. Reduction of dosage in all cases eliminated reactions and all were able to continue with two courses of the eight-day treatment.

The rôle of intestinal changes, parasites, secondary involvement of the mucosa and sub-mucosa, gram-negative bacteria, anaerobic bacteria and changes in pH, as well as allergic reactions are not thoroughly understood. Further studies would be of value in determin-

ing the etiology and exciting cause of pruritus ani.

The rôle of oxyuris vermicularis and prevalence of the infestation is not fully appreciated. Better methods of detecting their presence are constantly desired. Their eradication by the use of gentian violet has been 100 per cent as far as we were able to determine. The possibility of oxyuris vermicularis as the exciting cause of regional ileitis cannot be completely overlooked.

REFERENCES

1. Norman, N. Philip. The etiology, pathology and therapeutics of the commoner forms of pruritus ani from a nutritional standpoint. *New Internat. Clin.* vol. IV, series 4, 1941. J. B. Lippincott.
2. Christensen, J. B. Medical control of pruritus ani. *J. Omaha Mid-West Clin. Soc.*, 6: 89, 1945.
3. Swinton, Neil W. Pruritus ani. *New England J. Med.*, 236: 169, 1947.
4. Foster, Paul D. and Hill, Malcolm R. Pruritus ani and its relationship to seborrheic eczema and dermatophytosis. *Arch. Dermat. & Syph.*, 41: 699–706, 1940.
5. Stillians, Arthur W. The therapy of pruritus. *J. A. M. A.*, 114: 1627–1632, 1940.
6. Turell, R., Buda, A. M. and Marino, A. W. M. Treatment of pruritus ani by tattooing with mercury sulfide. *Arch. Dermat. & Syph.*, 41: 521–526, 1940.
7. Turell, R. and Marino, A. W. M. Technic of tattooing with mercury sulfide for pruritus ani. *Ann. Surg.*, 115: 126, 1942.
8. Martin, Edward G. Pruritus ani—an allergy. *Am. J. Surg.*, 50: 653–656, 1940.
9. Cantor, Alfred J. Pruritus ani. *Am. J. Surg.*, 53: 121–124, 1941.
10. Taubenhaus, Lt. The treatment of intractable pruritus ani by tattooing with mercuric sulfide (Cinnabar). *U. S. Nav. M. Bull.*, 136–139, 1942.
11. Young and Scott. Radical operation for intractable pruritus ani. *Surgery*, 6: 911–915, 1943.
12. Turell, Robert. Tattooing with mercuric sulfide for the treatment of intractable pruritus ani. *Am. J. Obst. & Gynec.*, 42: 290–296, 1941.
13. Slocumb, Leith H. Pruritus ani. A study of mucosal pH and bacterial flora. *Am. J. Digest. Dis.*, 10: 227–234, 1943.
14. Cantor, Alfred. Pruritus ani. *Am. J. Diges. Dis.*, 10: 254–261.
15. Holehan, M. W. Pruritus ani. *J. Tennessee M. A.*, 39: 282–286, 1946.
16. Drueck, Charles J. Perianal urticaria. *Illinois M. J.*, 89: 72–74, 1946.
17. Aldrich, R. H. Pruritus ani and absenteeism. *Indust. Med.*, 12: 654–658.
18. Granet, Emil. Pruritus ani: the etiologic factors and treatment in 100 cases. *New England J. Med.*, 223: 1015–1020, 1940.
19. Hanes, Granville S. Treatment of pruritus ani, pruritus vulvæ and rectal prolapse by hypodermic injections of hydrochloric acid. *Tr. Am. Proct. Soc.*, 29: 112–126, 1928.
20. Guess, Harry C. Conclusions after four years' use of subcutaneous oxygen for the treatment of pruritus ani. *Tr. Am. Proct. Soc.*, 180–188, 1941.
21. Hill, Malcolm R. The etiologic relationship between dermatophytosis and pruritus ani. *Tr. Am. Proct. Soc.*, 41: 210–222, 1940.
22. Kallet, Herbert I. Therapeutic radiation for pruritus ani. *Tr. Am. Proct. Soc.*, 202–211, 1938.
23. Smith, Gladys C. and Richardson, Darwin L. An epidemiological study of pinworms in patients at Oklahoma Hospital for Crippled Children. *J. Oklahoma M. A.*, 40: 49–51, 1947.
24. Sisk, Wilfred N. Difficulties in the diagnosis and treatment of pinworm infection. *North Carolina M. J.*, 7: 250–253, 1946.
25. Miller, J. F. and Einhorn, N. H. Oxyuris. *Am. J. Dis. Child.*, 68: 376–381.
26. Petersen, Magnus C. and Fahey, John. Oxyuris. *J. Lab. & Clin. Med.*, 30: 259–261.
27. Brown, H. W. Intestinal helminths in New York and vicinity. *New York State J. Med.*, 45: 893–894, 1945.
28. Mazzotti, Luis and Osorio, Maria Teresa. The diagnosis of enterobiasis. *J. Lab. & Clin. Med.*, 30: 1046–1048, 1945.
29. von Hofe, F. H. An improved method of demonstrating ova of enterobius vermicularis. *J. A. M. A.*, 125: 27, 1944.
30. Sisk, Wilfred N. The modern treatment of pinworm infections. *North Carolina M. J.*, 5: 52–55, 1944.
31. Lane, Clayton. Threadworm infections. *Lancet*, 2: 511–513, 1944.
32. Evans, Howard L. and Moore, Halcutt. A comparison of gentian violet and hexylresorcinol in the treatment of pinworm infestation. *J. Pediat.*, 20: 627–631.
33. Cram, Eloise B. Studies on oxyuris. *Am. J. Dis. Child.*, 65: 46–59.
34. Sisk, Wilfred N. Effect of phenothiazine on intestinal parasites. *J. A. M. A.*, 357–360, 1943.
35. Augustine, Donald L. Trichinosis and enterobiasis: their importance in New England. *New England. Med.*, 226: 488–495.
36. Chomet, B. Oxyuris vermicularis infection of the wall of a fallopian tube. *Arch. Path.*, 34: 742–744.
37. Weller, Thomas H. and Sorenson, Chas. W. Enterobiasis: its incidence and symptomatology in a group of 505 children. *New England J. Med.*, 224, 143–146.
38. Kuitunen-Ekbaum, E. Phenothiazine in the treatment of enterobiasis. *Canad. Pub. Health J.*, 32: 308–313.
39. Cram, Eloise B. Studies on oxyuris. IX. The familial nature of pinworm infestation. *M. Ann. District of Columbia*, 10: 39–48.
40. Wright, Willard H. and Brady, Frederick J. Studies on oxyuris. *J. A. M. A.*, 114: 861–866, 1940.
41. Wright, Willard H. and Brady, Frederick J. Studies on oxyuris. Pub. Health Reports, 54: 2005–2016, 1939.
42. Shoshkes, Milton. The hydrogen ion concentration of the feces. *Gastroenterology*, 9: 765–772, 1947.

LYMPHOPATHIA STRICTURE OF RECTUM COMPLICATED BY SECONDARY STRICTURE OF ASCENDING COLON OF PROBABLE TUBERCULOUS ORIGIN

W. A. SCHEFFLER, M.D.
Camden, New Jersey

IN looking over the literature, the Index Medicus and the report of 476 lymphopathia cases by Louis T. Wright, Freeman and V. Bolden in the Archives of Surgery, November, 1946, covering the years 1930 to 1945, no case of a combined lymphopathia and tuberculous stricture could be located. It seems, therefore, that this unusual case may be worth while reporting.

CASE REPORT

C. F., a female, age thirty-three, was admitted to the Cooper Hospital medical service on December 8, 1945, with the chief complaint of diarrhea for two months and loss of considerable weight.

Laboratory findings showed general low blood count with increase in eosinophiles; red blood cells 2.8; hemoglobin 49 per cent; white blood cells 6,056; polymorphonuclears 53 per cent; lymphocytes 15; eosinophiles 23 per cent; and somewhat accelerated sedimentation rate. Blood chemistry was within normal limits. The stool was negative for ovae and parasites and repeatedly negative for Bacillus abortus, malaria and Wassermann reaction, doubtfully negative for paratyphoid and typhoid and positive for occult blood. Chest X-rays showed the trunk shadows to be rather heavy but no definite lung changes. General physical examination revealed nothing of special importance.

The proctologic examination was negative. On digital examination a narrow, firm, funnel-shaped stricture was found, beginning about 4 cm. above the anal orifice, allowing a French 16 bougie barely to be passed at its narrowest point. Some blood-tinged mucoid discharge was present. No fistulous tract or esthiomine were observed. The character of the narrowing suggested lymphopathia venereum as ideologic origin. A Frei test was positive—three plus.

She was dilated from a French 16 to 36 bougie, thereafter digitally and low pelvic diathermy in conjunction with sulfathiazole were given. She was discharged from the hospital as improved on December 24, 1945, and kept under observation in the Out-patient Department until the beginning of March, 1946. At this time symptoms of beginning intestinal obstruction prompted an x-ray study on March 8, 1946, which revealed, besides the rectal stricture, narrowing of the lumen of the ascending colon near the hepatic flexure. The terminal ileum likewise appeared narrow and spastic suggesting localized colitis and terminal ileitis. (Fig. 1.)

A barium enema was given on March 8, 1946. In the examination of the large bowel there was a definite constant narrowing of the rectum extending from the anus up to a point just above the rectosigmoid. The walls of the rectum appeared somewhat thickened and the process appeared to be of relatively long-standing. The sigmoid loop appeared fore-shortened. Narrowing of the proximal ascending colon just below the hepatic flexure was also noted. The mucosa in this area appeared hyperplastic; the terminal ileum showed areas of spasticity and dilatation. No other abnormalities were observed in the large bowel. In the contrast film with air these findings were confirmed.

Diagnosis: Rectal stricture with suggestive localized colitis of the proximal ascending colon, etiology indeterminate.

When obstructive symptoms got more pronounced, the patient was re-admitted on the surgical service April 24, 1946. Her complaints were frequent colicky pains in the right upper quadrant and vomiting after eating meat. General examination and laboratory findings on admission showed nothing extraordinary. When conservative treatment failed to improve her condition an exploratory laparotomy was done after suitable preparation on May 13, 1946.

A left paramedian incision was made. On opening the peritoneal cavity no abnormal fluid was observed. The small bowel was seen to have many small nodules about 0.5 cm. in diameter on its surface. There was surrounding induration at the bases of the nodules. The ascending and descending colon was adherent in the lateral gutters and thickened. The descending colon, sigmoid and rectum especially were greatly thickened and indurated. The liver felt nodular. A nodule from the intestinal surface was excised for biopsy and the abdomen was closed in layers without drains.

Tentative diagnosis: Granuloma of ileum, possible regional ileitis.

FIG. 1. Anteroposterior view showing narrowing of the rectum—lymphopathia stricture. The deformity of the terminal ileum, cecum and ascending colon is presumably due to tuberculosis (reversed print).

The pathologic examination revealed the following: The specimen was a nodule of white tissue 8 by 6 by 5 mm. On section the tissue was gray white, homogenous and fairly firm. The section revealed chronic granulomatous inflammatory tissue. The tubercle formation was that seen in tuberculosis with many giant and epithelioid cells. Only slight necrosis was present. A stain for tubercle bacilli was negative. Due to this, regional ileitis was considered more seriously although it was believed that tuberculosis was not necessarily ruled out.

Revised diagnosis: Terminal ileitis and lymphopathia venereum.

An uneventful recovery and considerable improvement followed under general supportive postoperative treatment including several blood transfusions and the patient gained some weight. Repeated chest x-rays on May 23 and May 29, 1948, showed a definite increase in opacity of the apices suggestive of tuberculosis but the sputum was negative.

The patient was discharged from the hospital on June 3, 1946, and followed up in the Out-patient Department. The rectal stricture appeared unchanged and could be kept dilated digitally. Bowel movements were fairly regular. Pulmonary x-rays on June 9, 1946, showed some improvement.

On August 21, 1946, lung x-rays showed increasing density in both upper interspaces and the patient was admitted to the Bonnie Burn Sanitorium in Union County, New Jersey.

Here, according to the report we received, further lung x-rays and Mantou test proved tuberculosis clinically although the sputum was negative. When the advancing gastrointestinal involvement produced obstructive symptoms again, a cecostomy was resorted to on November 27, 1946.

During the procedure a narrow stricture of the ascending colon was discovered which would not admit the index finger whereas the small intestine appeared normal at this time. A McBurney's incision was made on the right side and the cecum and appendix delivered into the wound with difficulty because of inflammation in the cecum. The small intestine presenting appeared normal. The cecum was tied down in one layer into the peritoneum and in another layer to the muscle and fascia. The appendix was removed. During the process the cecum was inadvertently entered and left open. Palpation of the other portion of the ascending colon revealed a stricture 3 inches from the top. The stricture would not admit the index finger. A tube was passed into the cecum as far as the stricture and sulfanilamide crystals were left in the wound.

Proctoscopic examination on April 29, 1947, showed the rectal stricture nearly closed. After general improvement under penicillin and sulfadiazine, the patient was discharged from the sanitorium on May 5, 1947.

She came to the Cooper Hospital Out-patient Department again on September 11, 1947, and October 1, 1947. At this time she had adjusted herself fairly well to her cecostomy. The rectal stricture appeared completely closed. Her general condition was satisfactory and she had gained some weight. On February 18, 1948, the cecostomy opening appeared rather narrow. The rectal stricture admitted a French 18 bougie. She reported that at times small amounts of feces were expelled by rectum. She appeared cheerful and generally improved. Thorough follow-up studies and x-rays are contemplated as soon as this can be arranged since the patient lives quite a distance from the hospital.

The patient has received low pelvic diathermy and rectal dilatations at regular intervals. Fairly sized formed stools are passed by rectum. The ileostomy is closing gradually and leaks fluid stools only occasionally. Pulmonary x-rays show satisfactory arrest of her chest condition. Her general condition and mental attitude was encouraging when last seen in October, 1948.

BENIGN LYMPHOMA OF THE RECTUM

DAVID MILLER, M.D.
Los Angeles, California

IN the submucosa of the normal, human, large intestine one finds numerous scattered lymph nodules which frequently show germinal centers. The cecum and appendix are especially rich in these nodules. Frequently the lymphatic tissue penetrates the muscularis mucosa and extends to the undersurface of the epithelium pushing the mucosa ahead of it and presenting small elevations. This process may continue with the formation of nodules or tumors; even the mucosa adjacent to the nodule may become involved in an ulcerative condition.

One finds in the literature many cases of tumors of the rectum of lymphoid tissue origin. Kallet and Saltzstein in 1932 prepared a report entitled, "Sarcoma, Melanoma and Lymphosarcoma of the Rectum." In 1933 N. D. Smith of the Mayo Clinic reported on lymphosarcoma of the rectum and sigmoid. Kleiner in 1938 reported a case of lymphosarcoma of the anus. In 1938 Tucker and Helwig published a paper on proctologic tumors. Hayes, Burr and Pruit in 1939 reported a case of their own along with twenty other cases reviewed in the literature of simple lymphomas of the rectum and in their excellent report reviewed the lymphoid tumors of the colon and rectum. Tom E. Smith of Dallas, Texas, while in the service of the U. S. Army in 1943, reported three cases of "Primary Lymphoid Tumors of the Rectum Resembling Internal Hemorrhoids." He was the first, I believe, to report a benign lymphoid tumor of the rectum resembling an internal hemorrhoid. I have one case to add to this list. Recently, Dr. Fred Bradford of Los Angeles has found another.

CASE REPORT

My patient was a white, married woman fifty-four years of age. She was referred to me because she complained of protrusion of a small lump through the anal orifice when straining at stool and which was easily replaced after evacuation. Her physician had given her a complete physical examination including a gastrointestinal series and roentgenologic study of the colon. The latter revealed diverticulosis of the descending and sigmoid colon of which the patient had no symptoms. She had no complaints other than the appearance of a slight amount of bright red blood occasionally on the toilet tissue and the feeling of the protrusion of this small mass from the rectal outlet at bowel movement.

During proctologic examination an enlarged internal hemorrhoid was discovered in the right posterior quadrant and medium size external and internal hemorrhoids in other areas. The remainder of the examination of the anus, rectum and sigmoid was negative. The enlarged mass when viewed anoscopically appeared to be an elevation of the mucosa that was slightly reddened but not ulcerated and was about 1 cm. in diameter. It felt like a thrombus and was movable over the underlying structures but the mucosa was adherent to it.

Hemorrhoidectomy was performed June 1, 1946. The patient made an uneventful recovery and in four weeks the wounds were completely healed. The pathologist reported the specimen to be a nodular mass of lymphatic tissue with a general follicular structure. There was some fibrosis seen. There was a general increase in the loose lymphocytic tissue in the mucosa and submucosa. The pathologist's diagnosis was benign lymphoma of the rectum.

Follow-up examination of the patient every three months for one and one-half years showed no recurrence and recheck of all accessible lymphoid gland areas showed no enlargement. Roentgen therapy was not given because the tissue was benign and healing took a normal course.

CONCLUSION

In conclusion I wish to emphasize the importance of microscopic study of all tissue removed during surgical operations, particularly if the tissue is removed from the anorectal region.

REFERENCES

KALLET, H. I. and SALTZSTEIN, H. C. Sarcoma, melanoma and leukosarcoma of rectum. *Tr. Am. Proct. Soc.*, 33: 75–84, 1932.

SMITH, N. D. Lymphosarcoma of rectum and sigmoid, *Proc. Staff Meet., Mayo Clin.*, 8: 437–438, 1933.

KLEINER, SIMON B. A case of lymphosarcoma of the anus in a negro. *Tr. Am. Proct. Soc.*, 39: 116–119, 1938.

HAYES, H. I., BURR, H. B. and PRUIT, L. T. Lymphoid tumors of the colon and rectum. *Tr. Am. Proct. Soc.*, 40: 217–220, 1939.

LYNCH, J. M. and HAMILTON, G. J. Lymphosarcoma of the rectum. *Tr. Am. Proct. Soc.*, 40: 221–226, 1939.

SMITH, TOM E. Primary lymphoid tumors of the rectum resembling internal hemorrhoids. *J. A. M. A.*, 121: 495–498, 1943.

NEW SCLEROSING AGENT FOR HEMORRHOIDS*

A THREE-YEAR STUDY

MAX P. COWETT, M.D.
New York, New York

A THREE-YEAR study of a new sclerosing solution for hemorrhoids was started in September, 1944, at the New York University Rectal Clinic. In 1946 and 1947 the same solution was used at the Rectal Clinic of the Third Division at Bellevue Hospital.

TABLE 1
NUMBER OF CASES

	1944	1945	1946	1947	Total
New York University	19	51	47	39	156
Private	15	47	30	32	124
Bellevue	..	..	55	53	108
All institutions	34	98	132	124	388

Average number of injections: 8

Many solutions have been used in the injection treatment of hemorrhoids. The purpose of this paper is to give to the members of The American Proctologic Society our observations and results over a three-year period.

Sclerosing therapy is not to be thought of as a rival to surgery nor must it be used indiscriminately. It is not my premise in this report to give the indications and contraindications for the injection treatment of hemorrhoids. A number of cases in this group were best suited for surgery but because of such factors as cardiac decompensation, marked hypertension, renal disease and pulmonary tuberculosis we tried sclerosing therapy.

The solution used was a branched chain sodium alkyl sulfate (Sodium Sotradecol). The original experimental work on this particular solution was done by Reiner.[1] He concluded that this solution produced thrombi more readily with less tissue reaction and systemic toxicity than any of the other sclerosing agents such as phenol, quinine urea or any of the soap-type solutions. Cooper,[2] Hirschman[3] and others have reported very favorably on the use of this solution in the injection therapy of varicose veins.

In this study an attempt was made to evaluate the extent of obliteration of the injected hemorrhoid, the extent of fibrosis and the side effects such as pain, systemic reaction, irritation, inflammation, sloughing or bleeding.

The injection of 1, 2, 3 and 5 per cent solutions were attempted and it was found that in the higher percentages there was more irritation and a greater incidence of sloughs. For the past two years only 1 and 2 per cent solutions have been used and this was found to be satisfactory. It was also found that pain was more frequent when concentrated solutions were used.

The technic used was to inject into the hemorrhoidal mass starting with 0.3 cc. and increasing dosage to a maximum of 1.5 cc. at the fifth or sixth injection. The average number of injections for each case was eight, the minimum four and the maximum fifteen.

To study the effects of this solution further hemorrhoids requiring operation were injected. This was done at intervals of from 24 to 168 hours before operation. The excised hemorrhoid was examined histologically and the amount of fibrosis and tissue reaction was noted.

The tissue changes were not unlike those reported by Bacon[4] with quinine urea, Pruitt[5] with phenol in oil and Dukes and Anderson[6] also with phenol in oil.

The pathologic studies incidental to this report were done by Dr. J. W. Hall, Third Division, Bellevue Hospital.

We have numerous pathologic specimens but for the purpose of this report we have added hereto illustrations of four cases showing the pathologic changes following injection.

CASE 1. F. W., No. 17517. Twenty-four hours after injection microscopic examination revealed several small areas of intra-epithelial vesiculation. The underlying corium was edematous and diffusely infiltrated with lymphocytes. Throughout the section were many dilated hemorrhoidal veins.

* From the Department of Surgery, New York University College of Medicine and Third (New York University) Surgical Division, Bellevue Hospital, New York, N. Y.

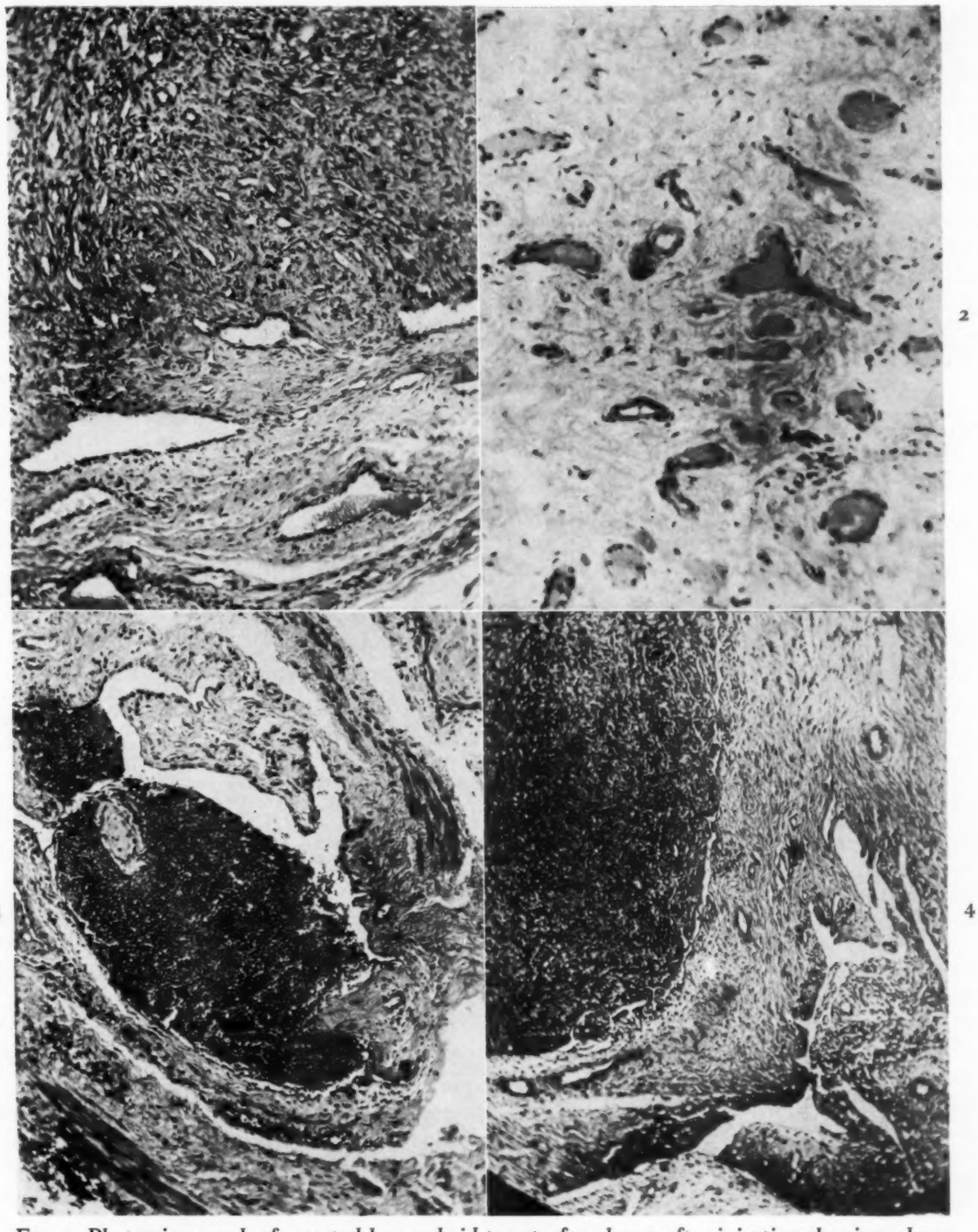


Fig. 1. Photomicrograph of resected hemorrhoid twenty-four hours after injection showing edema and infiltration with lymphocytes and considerable amount of extravasated lymph.
Fig. 2. Photomicrograph of resected hemorrhoid thirty-six hours after injection showing an acute inflammatory reaction with infiltration of polymorphonuclears and lymphocytes.
Fig. 3. Photomicrograph of resected hemorrhoid 124 hours after injection showing small thrombi with organization and considerable amount of fibrous tissue replacement.
Fig. 4. Photomicrograph of resected hemorrhoid 160 hours after injection showing fibrous tissue incompletely covered by squamous tissue. Elastic tissue stain shows almost complete loss of elastic tissue from the walls of the veins.

A considerable amount of extravasated lymph was noted. (Fig. 1.)

Pathologic diagnosis: Hemorrhoids with acute inflammatory reaction.

Case II. F. M., No. 2667. Thirty-six hours after injection microscopic examination of section showed stratified squamous epithelium and rectal mucosa with underlying connective tissue stroma. In the connective tissue stroma there were numerous congested blood vessels of varying sizes. The specimen showed an acute inflammatory reaction with moderate to marked edema and infiltration of polymorphonuclears and lymphocytes. (Fig. 2.)

Pathologic diagnosis: Acute inflammatory reaction.

Case III. F. Q., No. 5081-46. One hundred twenty-four hours after injection microscopic examination revealed numerous veins. A few of these showed small thrombi with organization. There was a considerable amount of fibrous tissue replacement. (Fig. 3.)

Pathologic diagnosis: Hemorrhoid with thrombosis and fibrous tissue replacement.

Case IV. L. G., No. 3315-45. One hundred sixty hours after injection microscopic examination of section showed fibrous tissue incompletely covered by squamous epithelium. In only one area were veins visualized. Elastic tissue stain showed almost complete loss of elastic tissue from the walls of the veins. (Fig. 4.)

Pathologic diagnosis: Hemorrhoid with fibrous tissue replacement.

One of the first observations made in studying this solution was the early fibrosis that occurred. Fibrosis usually develops four or five days after injection. This is determined by digital examination revealing induration at the site of injection. Rosser[7] has described submucous tumors which occurred after the use of phenol in oil. We have not encountered any such tumors. In a series of 388 cases, twenty-two patients or 5.7 per cent failed to show any evidence of fibrosis. If the cases that were unsuitable for injection were eliminated, we could have obtained fibrosis in a greater number of patients.

Table II

	1944		1945		1946			1947			Total	Percentage
	N.Y.U.*	Pvt.†	N.Y.U.	Pvt.	N.Y.U.	B.H.‡	Pvt.	N.Y.U.	B.H.	Pvt.		
Fibrosis	18	15	47	46	44	50	29	39	52	32	372	95.9
Pain at time of injection	2	1	4	1	3	5	1	1	1	2	21	5.4
Sloughing	5	0	8	9	12	1	1	4	5	0	45	11.6
Inflammation or proctitis	0	0	1	0	1	1	0	0	0	0	3	.8
Systemic reaction	0	0	1	0	0	0	0	0	0	0	1	.3
Bleeding	1	0	2	1	1	0	0	0	0	0	5	1.3

* New York University
† Private.
‡ Bellevue Hospital.

Sloughing occurred in fifty-three cases or 11.6 per cent. This is a rather high incidence but we considered every ulceration although slight to be a slough. The sloughs were very superficial and in no case was any tissue destruction seen. In a teaching institution various individuals perform the injections. This may account for the higher percentage of sloughs in the clinic cases. In the private patient group with one individual injecting the incidence of sloughs is low. In 1947 after we decided on the use of 1 to 2 per cent solutions the percentage of sloughs in all groups was greatly reduced.

Pain at the time of injection was noted in twenty-three cases. The pain was slight and lasted only one or two minutes. Pain developing several hours after injection was noted in eight cases which had been treated with a higher concentration of the solution during the initial period of this study.

Inflammation or proctitis occurred in three cases. One patient had a systemic reaction, chills and fainting sensation two or three hours after injection. This patient had a severe avitaminosis, hypoproteinemia and secondary anemia and edema.

Only those patients whose chief complaint was rectal bleeding were injected. Of the thirty-four patients injected in 1944 all but one were followed. In this group only one case had recurrence of bleeding. This patient had slight bleeding for three days in 1945 but none since.

In 1945 fifty one clinic and forty-seven private patients were treated. Of these two patients in the clinic group and one in the private group had a recurrence of bleeding. Bleeding in all these patients was transitory and lasted one or two days.

In 1946 there was a total of 132 patients treated and all but nine in the Bellevue Hospital group were followed. Only one patient has had a recurrence of bleeding and this according to the patient lasted one day. None of the cases with transitory recurrence of bleeding was given further injections.

We have practically complete protocols on all cases seen in the past three years and only five cases or 1.3 per cent had recurrence of bleeding. This approaches the results obtained by Milligan[8] in his paper published in 1939 who states that 98 per cent of patients with first degree hemorrhoids are cured by injection. From a review of 26,262 collected cases in which the patients were treated by injection, Kilbourne[9] estimated that recurrence took place in at least three years. The group we studied was very much smaller but it is our opinion that following the use of Sodium Sotradecol recurrence will be very much less.

SUMMARY

Sodium alkyl sulfate in a 1 or 2 per cent solution is a safe sclerosing agent to use in the injection therapy of hemorrhoids. In our hands this solution is more effective than solutions previously used, such as quinine, sylnasol or phenol. Fibrosis occurred more readily and patients have been symptom-free in less time than we have observed in using other sclerosing solutions.

REFERENCES

1. Reiner, L. *Proc. Soc. Exper. Biol. & Med.* 62: 49–54, 1946.
2. Cooper, William M. *Surg., Gynec. & Obst.*, 83: 647–652, 1946.
3. Hirschman, Sol R. *New York State J. Med.*, 1947.
4. Bacon, Harry E. Anus Rectum Sigmoid Colon. 1935.
5. Pruitt, M. C. Modern Proctology. St. Louis, C. W. Mosby & Co. 1931.
6. Dukes, C. and Anderson, H. G. *Brit. M. J.* 2: 100, 1924.
7. Rosser, C. Chemical rectal stricture. *J. A. M. A.*, 96: 1762–63, 1931.
8. Milligan, E. T. C. *Brit. M. J.*, 2: 412, 1939.
9. Kilbourne, Norman J. *Ann. Surg.*, 99: 600, 1934.

PERIANAL INFECTION IN THE TUBERCULOUS PATIENT

CLINICAL NOTES

JULIUS GERENDASY, M.D.
Elizabeth, New Jersey

FOR the purpose of this presentation 204 unselected tuberculous patients examined for anorectal symptoms in the proctologic clinic of the Berthold S. Pollak Hospital for Chest Diseases, September, 1943 to October 1946, were reviewed. The variety of lesions found was so extensive as to make desirable a selective analysis of the material. Therefore, this discussion will be confined exclusively to lesions of the "fistula" type, *which henceforth includes abscesses, sinuses and fistulas.* Seventy-nine patients came under this classification, including forty-five surgically treated patients and thirty-four in whom for various reasons only incision and drainage was performed. This subgroup was included since they presented the clinical characteristics of perianal suppurative lesions in the tuberculous and, by increasing the total number under consideration, they gave an added value to the conclusions.

TABLE I

Sex	Patients with Fistulas	Surgical Fistulas	Subgroup Incision and Drainage	Total
Males.....	66	40	26	79
Females....	13	5	8	
Age	**Thirty to Fifty**	**Under Thirty**	**Over Fifty**	
Males.....	33	20	13	79
Females....	8	5	..	

SEX AND AGE

As was to be expected males predominated at the ratio of sixty-six males to thirteen females. (Table I.) In our total series of rectal disorders, there were 151 males and 53 females. Since these "fistulas" are a complication of pulmonary tuberculosis, the age incidence naturally corresponds closely to that of the latter. The greatest number were in the third and fourth decades of life; thirty-two of the surgically treated patients were in this group, six patients were over forty and five under twenty. Two had arrested cases. In the subgroup of incision and drainage seventeen patients were in the third and fourth decade, four were over forty while twelve were under thirty years of age. Of the total number more than 60 per cent were in the third and fourth decades. In the entire group of seventy-nine patients the youngest was seventeen and the oldest sixty-six years of age. In our entire experience we cannot recall more than two or three children with tuberculous anal infection.

TABLE II

NATIONAL TUBERCULOSIS CLASSIFICATION AND SPUTUM STATUS IN SEVENTY-NINE PATIENTS WITH ANAL "FISTULAS"

National Tuberculosis Association classification[1]	Surgical Group	Subgroup Incision and Drainage	Percentage
Non-tuberculous.....	2	3	6.3
Minimal and moderately advanced.....	8	2	12.6
Far advanced.....	35	29	81.1
Sputum status			
Positive.....	32	29	77.2
Negative.....	7	4	13.9
Not reported.....	6	1	8.8

CLASSIFICATION ACCORDING TO EXTENT OF PULMONARY INVOLVEMENT

Most of the patients admitted had a mixed exudative and proliferative type of tuberculosis, frequently with cavitation. In the average yearly population of 560, 89 per cent had advanced pulmonary lesions. In our series of seventy-nine "fistula" patients all but two had

active pulmonary tuberculosis. In the forty-five surgically treated patients one had minimal, seven had moderately advanced and thirty-five had far advanced tuberculosis (Table II.) In the more seriously ill subgroup of incision and drainage patients, three were non-tuberculous, two had moderately advanced and twenty-nine had far advanced pulmonary tuberculosis. These figures indicate that the incidence of perianal "fistulas" increases with the extent of pulmonary tuberculosis.

Positive Sputum. In the series of forty-five surgically treated patients the incidence of positive sputum was 71 per cent; in the subgroup of thirty-four incision and drainage patients it was 85 per cent. (Table II.) Therefore, the total percentage in seventy-nine patients was 77 per cent.

Anal Fistulas. The forty-five surgically treated patients included twenty-one subcutaneous anal abscesses, twelve ischiorectal, eight postanal, two horseshow and two supralevator "fistulas." (Table III.) In the subgroup of thirty-four incision and drainage subjects there were fifteen anosubcutaneous infections, nine ischiorectal, seven postnatal and one supralevator "fistula." In two patients the records were incomplete. (Table IV.)

Internal Openings. In contrast to previous reports there were no internal openings in the great majority of our patients. Tables V and VI show that in thirty of the surgical patients and in twenty of the incision and drainage subgroup there was no such opening. Fourteen had pinpoint internal openings and twelve had ulcerated internal openings. In three cases the question could not be determined. We are unable to explain the discrepancy between our findings and those of others.[2–5]

When present, the internal opening was most often located to the right or left of the posterior or anterior midline of the anal circumference near the junction of the modified anal skin with the rectal mucosa. Some were in the lateral anal margins and a few at six or twelve o'clock. In three cases in which the tuberculous infection originated in a crypt of Morgagni the result was a deep ulcerated sinus. It is possible that

TABLE III
ANATOMIC CLASSIFICATION PERIANAL "FISTULAS" IN THE TUBERCULOUS
(Surgical Group)

Perianal Anosubcutaneous Fistulas		Ischiorectal		Postanal			Horseshoe Lesions	Supralevator	Remarks
Tuberculous Inflammation	Mixed Infections (Clinically Tuberculous)	Tuberculous Inflammation	Mixed Infections (Clinically Tuberculous)	Tuberculous Inflammation	Mixed (Clinically Tuberculous)	Pyogenic			
P. B. E. B. J. B. J. C. A. F. A. S. C. P. E. K. F. K.	R. B. J. F. J. T. R. M. M. H. W. K. J. R. J. S. A. H.* J. L. C. R. L. D.	J. B. J. D. E. F. J. G. J. H. C. K. E. K. F. P.	M. O. S. A. A. W. W. H.	J. F. R. D.	C. S. A. D. M. H. F. R.	J. W. M. M.	L. Mc* L. M.*	H. C.* H. H.	The anatomic classification is somewhat arbitrary in the case of ischiorectal fistulas. It is based chiefly on the involvement of perianal tissues sufficiently to penetrate this space
Total 9	12	8	4	2	4	2	2	2	

* Positive for tuberculous inflammation

TABLE IV
ANATOMIC CLASSIFICATION OF PERIANAL "FISTULAS" IN THE TUBERCULOUS
(Subgroup, Incision and Drainage)

Perianal Anosubcutaneous	Ischiorectal	Postanal	Supralevator	Not Determined
J. C.	R. H.	E. C.	G. McP.	E. M.
W. D.	H. H.	J. G.		G. O'C.
T. B.	C. S.	F. S.		
R. G.	A. A.	L. D.		
G. E.	G. G.	F. P.		
J. G.	T. P.	J. D.		
A. H.	R. T.	A. H.		
P. R.	E. K.			
J. R.	T. Q.			
G. S.				
R. H.				
G. M.				
F. B.				
R. S.				
R. M.				
Total 15	9	7	1	2

TABLE V
INCIDENCE OF INTERNAL OPENING IN CHRONIC PERIANAL "FISTULA"
(Surgical Group)

Primary Internal Opening Absent			Pinpoint Internal Opening	Ulcerated Internal Opening
P. B.	J. G.	W. D.	L. D.	A. A.
J. B.	H. H.	F. P.	C. K.	J. C.
R. B.	A. H.	J. R.	F. K.	A. D.
J. B.	E. K.	C. R.	M. M.	J. E.
H. C.	E. K.	R. G.	M. O.	J. H.
J. D.	J. L.	W. H.	J. S.	M. H.
R. D.	L. M.	A. S.	M. W.	S. K.
A. F.	R. M.	J. T.		C. S.
E. F.	L. Mc	J. W.		
J. F.	C. P.	A. W.		
Total 30*			7†	8‡

* Sixteen of these patients with histologically positive tuberculous sinuses had no primary anorectal internal opening; thirteen patients with mixed infection but clinically tuberculous sinuses had no internal opening; one patient with a primary pyogenic abscess had no internal opening.

† In two tuberculous sinuses a minute opening was present; in three mixed infections a minute internal opening was present; in two pyogenic abscesses a minute opening was present.

‡ Three tuberculous sinuses with an ulcerated internal opening; five with mixed infection had ulcerated internal openings. All the surgical patients had an external opening except one who had an ulcerated internal opening only.

some of the twelve ulcerated internal openings were due to crypt infection. Apparently the absence of a *primary* internal opening in most cases of tuberculous perianal "fistulas" is an important characteristic of this type of infection.

TABLE VI
INCIDENCE OF INTERNAL OPENINGS (ABSCESSES, SINUSES AND FISTULAS)
(Subgroup, Incision and Drainage)

Internal Opening		Internal Opening Not Accounted For	Remarks
Absent	Present		
J. C.	E. K.	G. G.	Primary incision and drainage was performed on twenty subjects
W. D.	R. G.	F. P.	
J. G.	R. M.	J. D.	
A. H.	F. B.		
G. E.	A. A.		Spontaneous rupture occurred in six patients
R. H.	E. C.		
J. R.	T. P.		
G. S.	F. S.		Chronic discharging fistulas (from 1 month to 12 years) were present in eight patients
P. R.	R. T.		
T. B.	A. H.		
R. H.	G. M.		
H. H.			
E. M.			There were twenty-six males and eight females in this subgroup
G. McP.			
L. D.			
G. O'C.			
T. Q.			
R. S.			
C. S.			
J. G.			
Total 20	11	3	

PATHOGENESIS OF PERIANAL INFECTION

We agree with others[6–8] that it is not safe to diagnose anorectal tuberculosis in the absence of active extrarectal tuberculosis or a history of previous infection. Infection leading to "fistula" in the tuberculous is generally supposed to originate in a crypt and burrow its way into the perianal tissue.[3,4,9,10] This is presumed to be the internal opening of the lesion, but we have not found it to be so. A typical tuberculous perianal infection rarely has its demonstrable origin in the rectum. Even in cases of mixed pyogenic and tuberculous infection an internal opening is the exception.

The usual mode of infection is the swallowing of sputum containing tubercle bacilli thus contaminating the feces with viable and viru-

lent organisms which spread to the perianal tissues by way of the lymphatic and blood vessels and by direct extension. Even a large perianal abscess frequently appears fully developed at the anal margin without any preceding symptom referable to the rectum.[11–13]

TABLE VII
INCIDENCE OF CHRONIC PERIANAL INFECTIONS (ABSCESSES, SINUSES AND FISTULAS)
(Surgical Group)

Histologically Positive for Tuberculous (primary) Inflammation*	Pathologic Report		Chronic Inflammation	
	Clinically Tuberculous Fistulas with Secondary Pyogenic Infection	Primary Pyogenic Infection (Tuberculous Superimposed, clinically Tuberculous)	Clinically Typical Tuberculous Sinus	Primary Pyogenic Sinus of Fistulas
P. B. J. G. J. B. J. H. E. B. C. K. J. B. E. K. H. C. F. K. J. C. L. Mc R. D. C. P. E. F. F. P. A. F. A. S. J. F. E. K. J. D	R. B. J. D. M. H. J. S. A. W. W. H.	S. A. A. D. L. D. H. H. A. H.* L. M.† R. M. C. S.	J. F. F. K. J. L. M. O. J. R. C. R. J. T.	M. M. J. W. M. W.
Total 21	6	8	7	3

* Clinically typical tuberculous sinuses with seropurulent discharge.

† Pathologic report of tuberculous inflammation added to twenty-one in the first column, the total is twenty-three histologically tuberculous perianal infections.

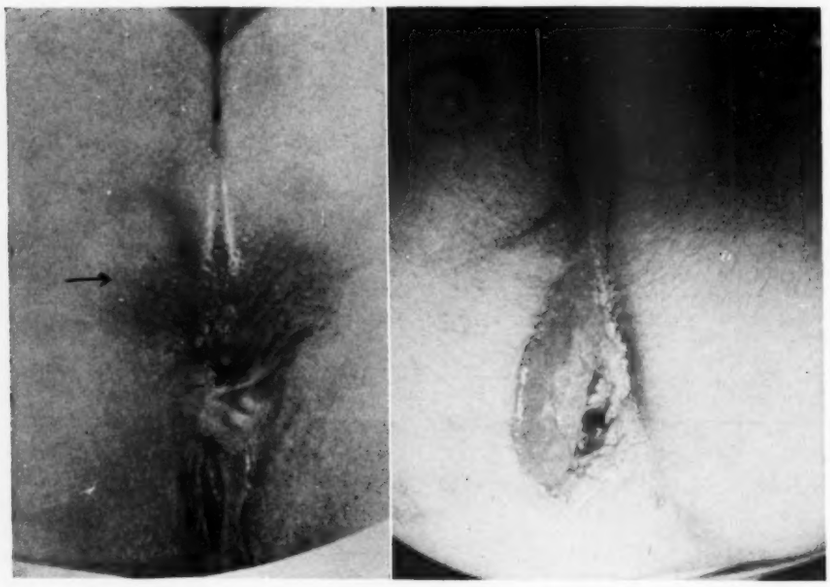
The infection apparently spreads from the rectum through the lymphatic channels[13,14] directly beneath the sphincter muscles and the squamous lining of the anal canal.

In the usual type of anal tuberculosis the earliest demonstrable lesion appears to be a slightly tender nodule in a localized segment of the anal verge. At this nodular stage it may regress spontaneously, depending on the virulence of the organism and the resistance of the patient. If the nodule develops into a so-called primary, acute, "pure" abscess, aspiration may reveal a pure culture of the tubercle bacillus.[15] Tables VII and VIII indicate the pathologic nature of the various subdivisions in seventy-nine patients. When the nodule continues to

TABLE VIII
INCIDENCE OF PERIANAL INFECTION (ABSCESSES, SINUSES AND FISTULAS)
(Subgroup, Incision and Drainage)

Histologically Positive for Tuberculous Inflammation (Sputum, All Far Advanced Cases)	Pathologic Report, Chronic Inflammation		Clinical or Laboratory Status Not Determined
	Clinically Tuberculous Abscess with Secondary Pyogenic Infection	Primary Pyogenic Fistulas	
J. C. W. D. G. E. R. G. J. G. A. H. R. H. P. R. J. R. G. S. R. S. F. B.	T. B. R. M. R. H. H. H. E. M. G. M. C. S.	G. O'c. T. Q. E. K. F. P. J. D. A. H.	A. A. E. C. L. D. G. G. J. G. G. McP. T. P. F. S. R. T.
Total 12	7	6	9

enlarge, it usually spreads along the perianal subcutaneous lymphatic network. There is little pain or tenderness and the temperature is often not higher than that already present as a result of tuberculosis elsewhere in the body. Later the nodule becomes reddened over a small area and a thin seropurulent discharge appears through a minute external opening. A probe passed through the opening can be moved freely directly under the skin, indicating the superficial nature of the infection. In two or three weeks the discharge ceases, the symptoms subside and the wound is apparently healed, but it remains a focus of infection. Acute infection may recur months or years later unless the lesion is surgically eradicated. In eighty-four patients with healed lung lesions with negative sputum Martin[5] found ten with posi-



1 2

FIG. 1. Group 1, typical primary tuberculous abscess, characterized by a relatively painless, slightly elevated, subcutaneous perianal swelling with very little inflammatory reaction. (GRANET, E. and GERENDASY, J. *Quart. Bull. Sea View Hosp.*, 4: 445–452, 1939.)

FIG. 2. Group 1, removal of the overlying skin (shown in Fig. 1) reveals the superficial nature of this tuberculous infection as well as typical violaceous granulations.

tive tuberculous lesions in the anorectal region. Such a focus may cause auto-inoculation of the anal region[4,11,16,17] or be a factor in gastrointestinal infection. The following case report confirms this:

CASE REPORTS

E. K., aged twenty-eight, a single female was admitted September 29, 1943, for surgical treatment of discharging perianal lesion. Active pulmonary tuberculosis with positive sputum was diagnosed in December, 1935. From then until May 1938 she was treated in a tuberculosis sanatorium. Her general condition was good until two months prior to admission when she developed a left perianal abscess. Spontaneous rupture and continuous discharge of seropurulent material persisted since its onset. Examination in the proctologic clinic revealed a minute opening in the left anterior perianal quadrant 3 inches from the dentate line. Probing showed the sinus to be subcutaneous with no internal opening. Surgical excision was done on October 6, 1943. Culture of the tissue was positive for tubercle bacilli. Complete healing was accomplished in five weeks.

That the preceding facts are not generally known is shown by the following case report on "Perirectal Sinus and Employability" taken from "Queries and Minor Notes"[18] with the erroneous answer:

"To the Editor:—Precedents are desired with regard to the employability of a person having a perirectal sinus presumably of tuberculous origin. The discharge is slight. There are no other open tuberculous lesions. The patient's state of health is stabilized and he is considered physically able to carry on his former work. Are esthetic and hygienic considerations so serious that his former employer should consider him unfit to work with other employees and to use the same lavatories? He belongs to the white collar class. (M.D., New Jersey)

"ANSWER: No precedents have been found to interfere with the employability of a person having a perirectal sinus due to tuberculosis, without other demonstrable lesions."

CLASSIFICATION OF LESIONS

Chronic discharging anal lesions in the tuberculous may be divided into five clinical groups on the basis of pathologic anatomy as follows: (1)primary tuberculous abscess; (2) tuberculous sinus with secondary pyogenic involvement; (3) pyogenic infection with secondary tuberculous involvement; (4) tuberculosis cutis orificialis; (5) primary pyogenic anal abscess. The first four groups are tuberculous "fistulas."

Group 1: *Primary Tuberculous Abscess.* This group is the most common type of tuberculous anal infection. (Figs. 1 and 2.) It is illustrated by the following case:

F. K., aged thirty-three a white male, had an infiltrative pulmonary process and a small cavity with contralateral dissemination. Examination of the sputum was positive. Examination in the proctologic clinic on November 11, 1943, revealed a tender, circumscribed induration involving the anterior anal region. There was a discharge of seropurulent material through a minute external opening. Probing showed the infection to be subcutaneous, extending along the anal margin but not involving the rectum. Palpation showed the central part of the area to be slightly depressed, somewhat tender and with a suggestion of liquefaction of tissues. Surgical excision of the entire infected area was done on November 18, 1943. The culture was positive for tubercle bacilli and excised tissue revealed tuberculous inflammation. Repeated reinfection of the perianal region, including the operative wound, delayed healing. He was discharged from the proctologic clinic as cured on July 9, 1944.

The foregoing case is not typical of all tuberculous anal infections. Certain important factors modify the degree of tissue involvement, two of which are: (1) the inflammatory reaction in the tissues caused by the tubercle bacillus *per se*, and (2) certain conditions in which pyogenic organisms are superimposed on or precede the tuberculous infection.

Group 2: *Tuberculous Sinus with Secondary Pyogenic Involvement.* This second group is characterized by pain in the anal region and rapid formation of a tender induration near the anal margin. The temperature may be one or two degrees above normal. If not excised, the abscess ruptures and discharges a frankly purulent material for a short time. There is a large ragged external opening surrounded by dusky or cyanotic skin which contains typical violaceous tuberculous granulations. (Fig. 3.) When a tuberculous sinus is secondarily infected with pyogens, the latter apparently soon disappears leaving a thin discharge which persists until excision.

C. P., a white male aged fifty was admitted December 14, 1945, with extensive bronchopneumonic cavernous process in both upper lobes as well as positive sputum. An extensive postanal abscess with indurated margins developed. There was a creamy, purulent discharge through a ragged external opening. Typical violaceous granulation tissue was present. Complete excision was performed with wound healing in eight weeks. Biopsy specimen showed tuberculous inflammation.

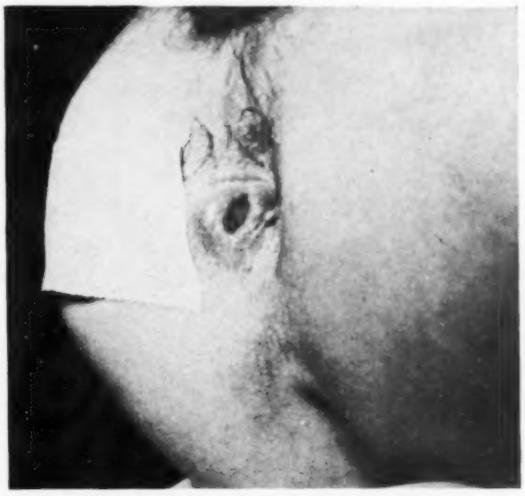
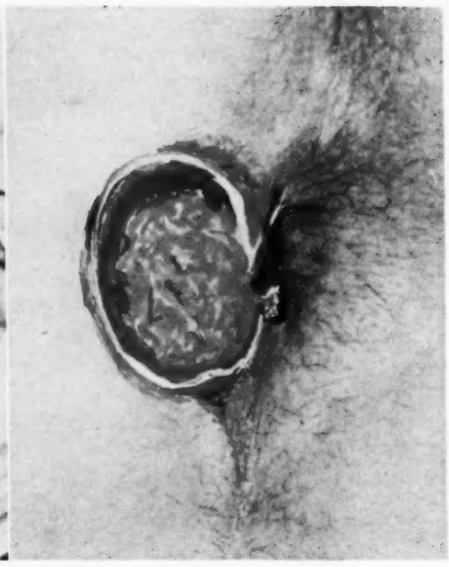


FIG. 3. Group 2, tuberculous sinus with secondary pyogenic infection characterized by a cavity lined with tuberculous granulation tissue. The external opening is surrounded by edematous cyanotic skin. (GRANET, E. and GERENDASY, J. *Quart. Bull. Sea View Hosp.*, 4: 445–452, 1939.)

Group 3: *Pyogenic Infection with Secondary Tuberculous Involvement.* This group begins as a frankly pyogenic abscess with rapid formation of a circumscribed fluctuating mass, severe throbbing pain and a rise of temperature to 103 to 104°F. Incision and drainage evacuates a foul, frankly purulent material typical of a pyogenic infection. (Figs. 4 and 5.) The infection involves the deeper structures and a fairly large cavity is formed, lined with typical violaceous granulation tissue. Spread of the infection into the deeper tissues is clearly defined and does not extend beyond the fascial plane of perianal spaces. This type occasionally contracts to a fibrous tract and simulates the pyogenic fistula.

A. H., a white male aged fifty-seven, was admitted September 7, 1945, with pulmonary tuberculosis II-A and positive sputum. On December 2, 1946, incision and drainage of the right ischiorectal abscess was done with an evacuation of a large amount of foul, purulent material. The culture was positive for B. coli and Staph. aureus. On December 14, 1946, complete excision of the infected sinus, including several hemorrhoids, was done. No internal opening was found. The wound healed completely in five months. The pathologic report showed tuberculous inflammation.

4



5

FIG. 4. Group 3, pyogenic abscess with secondary tuberculous infection; note the acutely inflamed circumscribed swelling, typical of a pyogenic abscess.
FIG. 5. Group 3, the evacuated pyogenic abscess revealed a definite cavity lined with violaceous granulations pathognomonic of tuberculous infection. (GRANET, E. and GERENDASY, J. *Quart. Bull. Sea View Hosp.*, 4: 445–452, 1939.)

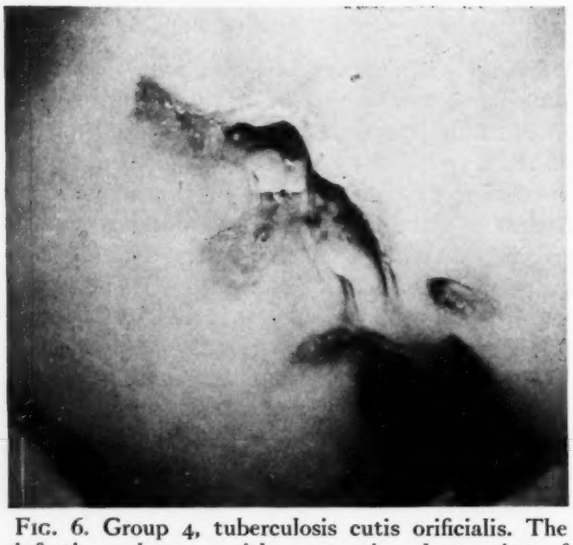


FIG. 6. Group 4, tuberculosis cutis orificialis. The infection advances with progressive destruction of tissue in a patient with rapidly progressing tuberculosis and poor resistance. (GRANET, E. and GERENDASY, J. *Quart. Bull. Sea View Hosp.*, 4: 445–452, 1939.)

Group 4: *Tuberculosis Cutis Orificialis.* This group is characterized by ulceration beginning either at the anal margin or at the mucocutaneous junction. The condition is progressive and destroys the rectal mucosa or, more often, the perianal skin for several inches. We agree with Fansler and Potter[19] that it is a terminal complication in a patient with poor resistance or a virulent type of tuberculous infection. (Fig. 6.) If combined with laryngeal tuberculosis, streptomycin usually cures the latter and may help to heal the anal lesion if this is not too extensive.

R. D., a white male aged forty-five, was admitted with an extensive bronchopneumonic cavernous process in both upper lobes as well as positive sputum. A large, progressively invasive postanal ulceration involved the rectal mucosa and adjacent skin but not the deeper structures. It was very painful. Surgery was contraindicated because of the patient's toxic condition. Grenz rays had no beneficial effect, and the patient died shortly after examination.

Group 5: *Primary Pyogenic Anal Abscess.* In this group the perianal abscess is typical of those caused by pyogenic organisms and the onset is the same: rapid formation at the anal margin of a painful fluctuating mass associated with tenderness and fever. It contains foul, purulent material and the cavity is lined with the usual pyogenic membrane. In the chronic stage it becomes the typical pyogenic fistula with a contracted fibrous tract and an external cicatricial opening. After surgical extirpation

healing is rapid and complete, usually within three or four weeks.

J. W., a white male aged forty, was admitted with partial consolidation of the right upper lobe and positive sputum. Creamy pus exuded through a small internal opening to the right of the posterior midline. The entire infected area was excised December 14, 1946. The wound healed in three weeks. Biopsy showed chronic inflammation (non-tuberculous).

In order to appreciate the clinical manifestations and understand the anatomic variations of tuberculous perianal infection a knowledge of the anal and rectal lymphatic network is essential.[13,14,20] Infection of the anorectal lymphatics explains in most cases the spontaneous appearance of abscesses at the anal margin without symptoms referable to the rectum.

Infection of the lymphatics in the anorectal region may be caused by: (1) Extension of rectal inflammation caused by contaminated stools through wounds and injuries of the rectal mucosa. Proctoscopy often reveals multiple erosions in the rectal mucosa due to rectal (stool) stasis or scybalous stools. Constipation is common in bedridden tuberculous patients. In our series of seventy-nine patients thirty-five had chronic constipation and several suffered from diarrhea. (2) Retardation of the rectal circulation due to rectal stasis and the sedentery position of these patients favors inflammatory processes about the anorectal region.[21] (3) The swallowed sputum containing tuberculous bacilli. The constant presence of these organisms in the rectum maintains the infection and encourages new lesions.

SUMMARY AND CONCLUSIONS

1. The subject of perianal infections in the tuberculous has been discussed from the point of view of its origin and development and the specific clinical characteristics.

2. A classification of the more common infectious anal lesions found in tuberculous patients has been introduced. Each group has been described and illustrated with case reports.

3. Certain characteristics of tuberculous perianal infection distinguish it from the ordinary pyogenic type of infection.

4. A diagnostic triad consists of the characteristic clinical picture of a tuberculous anal lesion, its peculiar mode of development and the typical histologic structure of the tubercle.

5. A tuberculous perianal discharging wound is usually not a fistula but rather a sinus. The term fistula in connection with tuberculous perianal infection is improper terminology. It confuses this specific lesion with pyogenic fistulas. A cord-like fibrous tract is not the rule; it is usually a chronic abscess frequently superficial.

This is only one example which indicates that the entire subject of tuberculous anal infections, particularly as it appears in proctologic textbooks, should be revised. At present these contain little useful information. Emphasis should be placed on this disease as a specific entity caused and maintained by the tubercle bacillus. It is generally a complication of pulmonary or other extrarectal tuberculosis. The hypothetic relation of the ordinary type of pyogenic fistula to this condition should be omitted from all future considerations.

REFERENCES

1. Diagnostic Standards and Classification of Tuberculosis. National Tuberculosis Association, 1940.
2. Marino, A. W. M., Buda, A. W. and Skir, I. Anorectal tuberculosis. *Tr. Am. Proct. Soc.*, 219–235, 1938.
3. Goorwich, J. Anorectal surgery in the tuberculous. *Am. Rev. Tuberc.*, 45: 410–426, 1942.
4. Joynt, G. H. C. Anorectal tuberculosis. *Am. Rev. Tuberc.*, 41: 760–769, 1940.
5. Martin, C. L., Lansford, W. I. and Sweany, H. C. Etiology of tuberculous anal abscess and fistula. *Tr. Am. Proct. Soc.*, 184–191, 1939.
6. Stone, H. B. The relation of fistula-in-ano to tubercle infection. *Tr. Am. Rev. Tuberc.*, 1: 548–559, 1917.
7. Petter, C. K. and Fansler, W. A. Tuberculosis of anus and rectum. *Tr. Nat. Tuberc. A.*, 26: 159–163, 1930.
8. Spiesman, M. G. Gastro-intestinal tuberculosis. *Rev. Gastroenterol.*, 6: 483, 1939.
9. Granet, E. The treatment of perianal tuberculosis. *Ann. Surg.*, 112: 440–453, 1940.
10. Buie, L. A., Smith, N. D. and Jackman, R. J. The role of tuberculosis in anal fistula. *Surg., Gynec. & Obst.*, 68: 191–195, 1939.
11. Tuttle, J. P. A Treatise on Disease of the Anus, Rectum and Pelvic Colon. P. 323. New York, 1902. D. Appleton & Co.
12. Miles, W. E. Rectal Surgery—A practical Guide to the Modern Surgical Treatment of Rectal Diseases. London, 1939. Cassell & Co., Ltd.
13. Gorsch, R. V. Perineopelvic Anatomy. P. 260. New York. The Tilghman Co.
14. Poirier, P., Cuneo, B. and Delamere, G. The Lymphatics. Chicago, 1904. W. T. Keener & Co.

15. Pottenger, J. E. and Pottenger, F. M., Jr. Demonstration of mycobacterium tuberculosis in anorectal abscess. Surg. Gynec. & Obst., 72: 936–938, 1941.
16. Buie, L. A. and Redding, M. D. Anal tuberculosis. *J. A. M. A.*, 117: 1169–1171, 1941.
17. Gant, S. G. Diseases of the Rectum and Anus. P. 279. Philadelphia, 1903. F. A. Davis Co.
18. Queries and Minor Notes. *J. A. M. A.*, 112: 663, 1939.
19. Fansler, W. F. and Petter, C. K. The surgical treatment of rectal tuberculosis. *Surg. Gynec. & Obst.*, 57: 115–118, 1933.
20. Nesselrod, J. P. Anatomic restudy of pelvic lymphatics. *Ann. Surg.*, 104: 905–916, 1936.
21. Esmarch.[11]

COLONIC ADENOMAS

ROBERT TURELL, M.D.
New York, New York

RECORDED in this paper[1] are the results of a study of the incidence of colonic adenomas found on sigmoidoscopic examination in symptomless individuals; (2) the comparative results of a similar investigation of an equal number of patients with adenomatous polyps but who complained of bleeding from the rectum; and (3) an evaluation of therapy as applied to the latter group of patients as well as to other personal material.[1]

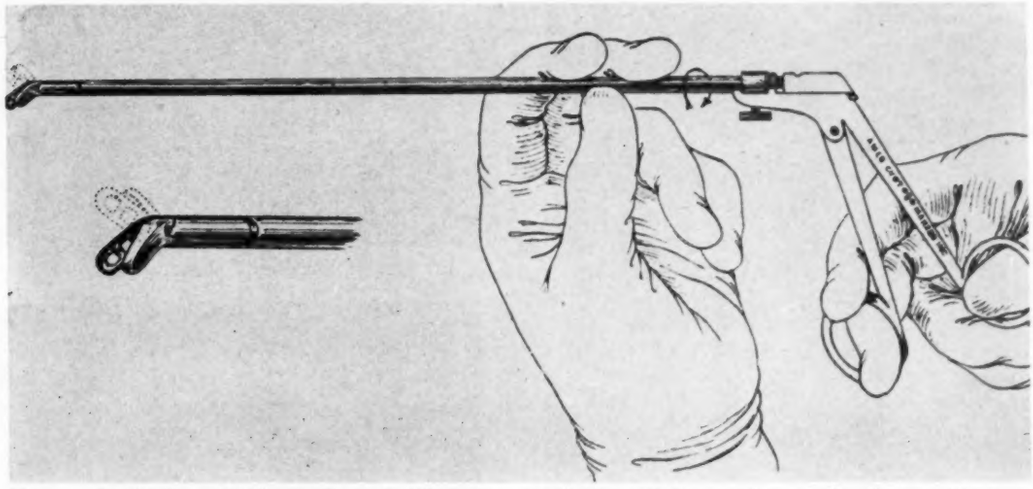


FIG. 1. Author's cold biopsy forceps. Note the angulation of the cutting mechanism and rotary movement (360 degrees) of shaft. (Courtesy of *Ann. Surg.*, J. B. Lippincott Co.)

In this study adenoma is defined as a glandular structure which shows proliferation of the colonic epithelium without invasion of the wall of the bowel. This lesion is regarded as a benign neoplasm.

Material and Method. Three hundred eighty-six individuals under forty-five years of age who had had no intestinal complaints were subjected to a proctosigmoidoscopic examination. The preparation consisted of two lukewarm, plain water enemas taken at intervals of five to eight hours. The second enema was usually given approximately three hours before the time of sigmoidoscopy. Unless the mucosa was free from irremovable particles of feces or secretions which might obscure the visualization of small lesions, re-examination was performed after additional similar preparation.

The sigmoidoscopy was performed in the knee-chest position with a sigmoidoscope 25 cm. long and about 2 cm. in diameter with the aid of gentle insufflation. Insufflation was especially useful for the visualization of 3 to 5 cm. of the sigmoid colon beyond the end or reach of the sigmoidoscope. Thus, a distance of 25 cm. or more of the terminal bowel was visualized in each instance.

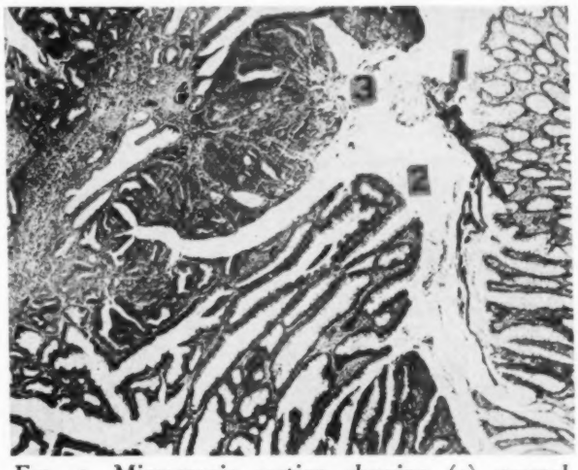


FIG. 2. Microscopic section showing (1) normal colonic mucosa; (2) adenomatous polyp and (3) early malignant focus.

FIG. 3. High power magnification of (2) in Figure 2.

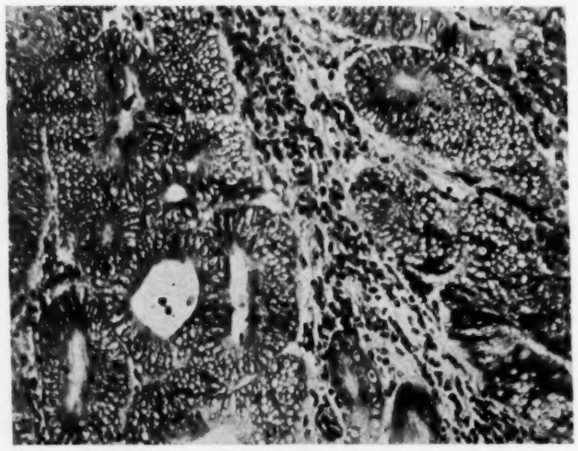


FIG. 4. High power magnification of (3) in Figure 2.

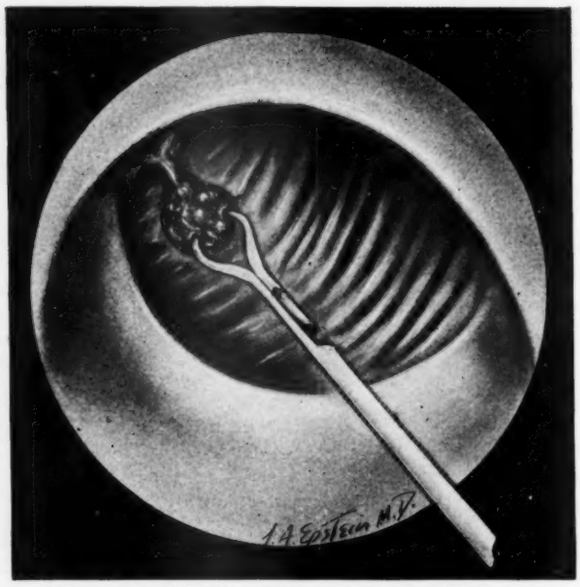


FIG. 5. Application of tumor grasping forceps.

FIG. 6. Position of wire of electric snare around stalk of pedunculated polyp.

Grossly mucosal elevations were recorded and either the entire lesion or pieces of tissue from the growth were removed for histologic studies with the aid of a cold biopsy forceps.[2] This has a shearing jaw mechanism with an angulation of 30 degrees and is provided with a shaft that can be rotated 360 degrees. (Fig. 1.)

In the case of sessile growths an attempt was made to secure representative biopsy specimens from the center, periphery and surrounding mucosa including basal submucosal structures in order to show the presence or absence of infiltration of the muscularis mucosae. In pedunculated lesions pieces of tissue were usually removed from the body and sometimes from the base of the pedicle.

Results. This investigation elicited seven polyps and nine definite mucosal excrescences in fourteen patients. In one patient a combination of one pedunculated polyp and two mucosal excrescences was present. The mucosal excrescences varied in size from 1 to 4 mm. and were grossly sessile while three of the seven polyps were pedunculated. Their tips or bodies were over 0.5 cm. in diameter and the length of the pedicle varied from approximately 5 mm.

to 1 cm. All adenomas appeared grossly benign. Except for the characteristic elevation, the mucosal excrescences resembled the surrounding mucosa which was normal in all cases; the tips of the pedunculated polyps were redder or darker than the adjacent mucosa. Anal fibroepithelial polyps (hypertrophied papillae) were excluded from this study.

Histologically, the adenomas showed hyperplastic, relatively mature or well differentiated epithelial cells of uniform appearance supported by a central core of loose connective tissue and contained stalks of varying numbers, sizes, shapes and lengths. These differ from the normal mucous membrane of the colon where a single layer of cells lines the crypts and covers the surface. Some of the cells contained a rich complement of mucus and fully resembled normal colonic epithelium while other cells contained little or no mucus, were stratified and exhibited a fair number of mitoses. Unless

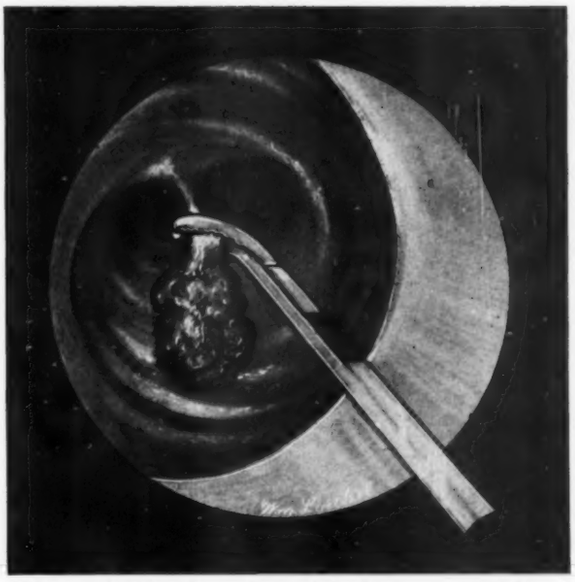


FIG. 7. Application of special clamp to pedicle of adenoma.

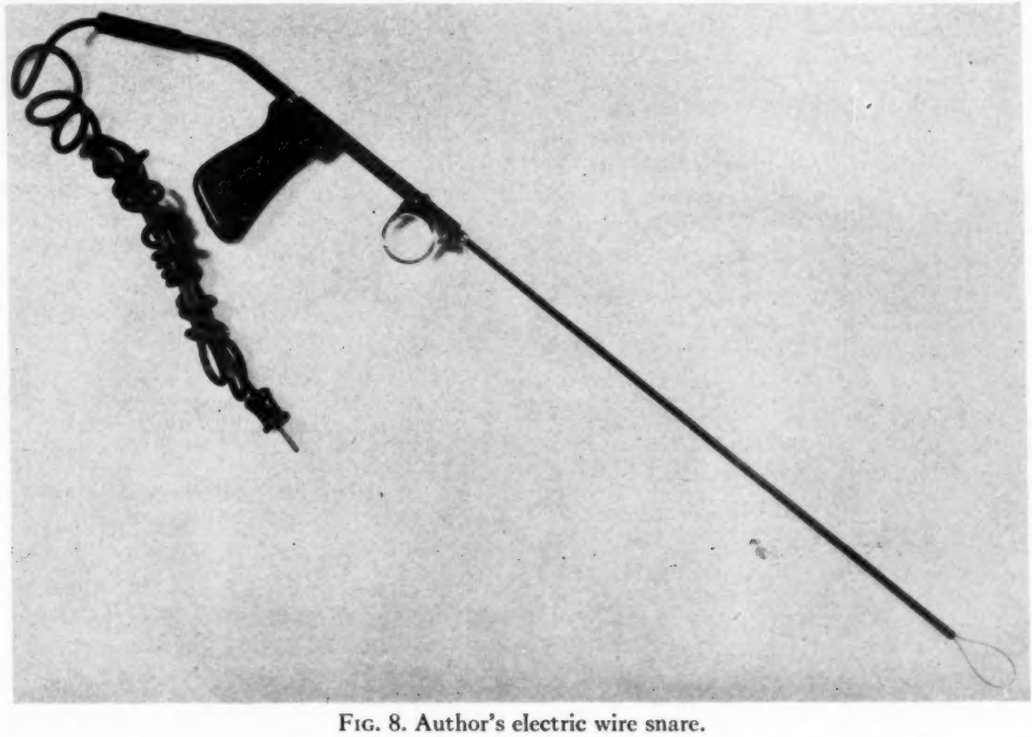


FIG. 8. Author's electric wire snare.

secondary infection or ulceration had occurred, no significant inflammation was found in the polyps or supporting tissues. (Figs. 2 and 3.)

When pronounced dedifferentiation was present, the lesion was considered an early, preinvasive, malignant transformation of an adenomatous polyp. (Figs. 2 and 4.) This reversion to the more immature or undifferentiated type of cell may show atypism, large vesicular or hyperchromatic nuclei, frequent mitoses and excessive stratification.

Comparative Material. The foregoing study was compared and contrasted with a similar investigation conducted five years earlier with an equal number of patients but an older average age of approximately fifty years. These

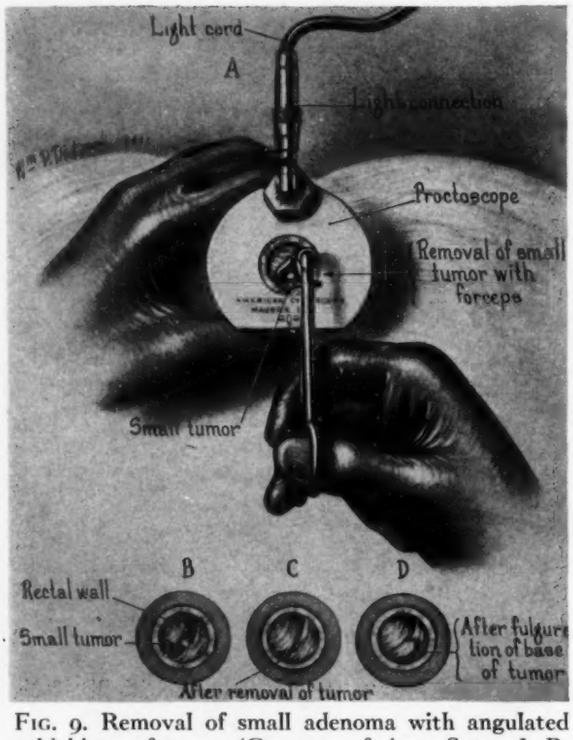


FIG. 9. Removal of small adenoma with angulated cold biopsy forceps. (Courtesy of *Ann. Surg.*, J. B. Lippincott Co.)

patients presented themselves because of intestinal symptoms, primarily bleeding from the rectum. In the latter group of patients sigmoidoscopy yielded twenty-seven adenomatous polyps exclusive of mucosal excrescences. An additional 1 per cent of pedunculated polyps situated beyond the reach of the sigmoidoscope was elicited on roentgenography. Significantly, five of the grossly benign-appearing, pedunculated adenomas showed malignant foci in their bodies upon histologic examination. Two patients with benign sessile polyps which were situated in the ampulla postponed treatment. After a lapse of approximately three years adenocarcinoma was found in the previously benign lesions of these individuals.

Comment. If the excrescences of the glandular mucosa (regarded by some authors as tiny sessile adenomas) are excluded, the clinical significance of the finding of definite adenomas in asymptomatic individuals remains for consideration. In a study of 241 consecutive necropsied colons of individuals varying from newborn infants to adults ninety years of age, Atwater and Bargen[3] noted an incidence of 69 per cent of polyps; no polyps had been observed by them until the fourth decade of life. These observations suggest the advisability of routine sigmoidoscopy as part of a comprehensive, general, physical examination, particularly in the older age group. This relatively simple examination will elicit approximately 50 per cent of benign and 75 per cent of malignant lesions of the terminal portion of the colon.

The propensity of benign adenomatous polyps to undergo malignant transformation is again exemplified by the cases just cited. Atwater and Bargen[3] regard benign polyps as "one stage in the pathogenesis of a carcinoma." Other authorities also regard benign adenomas as "precancerous" lesions.[4–7] Coller and Berry[5] stated unequivocally that colonic polyps "are always precancerous lesions with a high chance of becoming cancerous." Since it is grossly difficult to define and recognize the transition from adenoma to carcinoma, I set out to observe these lesions histologically by means of periodic biopsies, hoping to learn more about the genesis of colorectal carcinoma. However, as this investigation progressed I realized that such a clinical experiment has little chance of success primarily because patients would hardly cooperate in a long-range study. This was shown by the behavior of two of my intelligent patients: One disappeared from observation after one re-examination while the second patient developed cancerphobia, necessitating the immediate extirpation of the polyp under observation.

Treatment. Because colonic adenomas are believed to constitute precursors of malignancy, it has been my policy to advise the eradication of these lesions upon clinical discovery before cancerous transformation has a chance to develop.

Endoscopic fulguration was employed for the extirpation of the pedunculated and sessile adenomas that were situated within the reach of the sigmoidoscope. Growths situated below the peritoneal reflection were treated in the office or clinic while those located above the peritoneal reflection, or the large sessile adenomas, were preferably treated in the hospital.

The pedunculated polyp may or may not be grasped at its tip with a suitable forceps (Fig. 5) before a wire snare is applied to the pedicle about 0.5 cm. from the base. (Figs. 6 and 7.) After the electric activation of the wire loop of the snare, the stalk of the polyp is strangulated by pulling the wire loop slowly into the hollow of the shaft of the snare, thus electrically

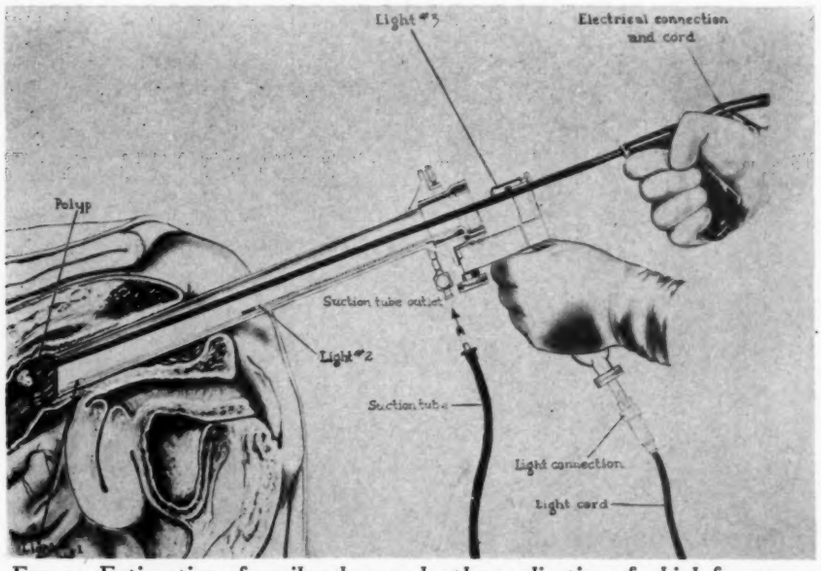


FIG. 10. Extirpation of sessile adenoma by the application of a high frequency current through a suitable electrode.

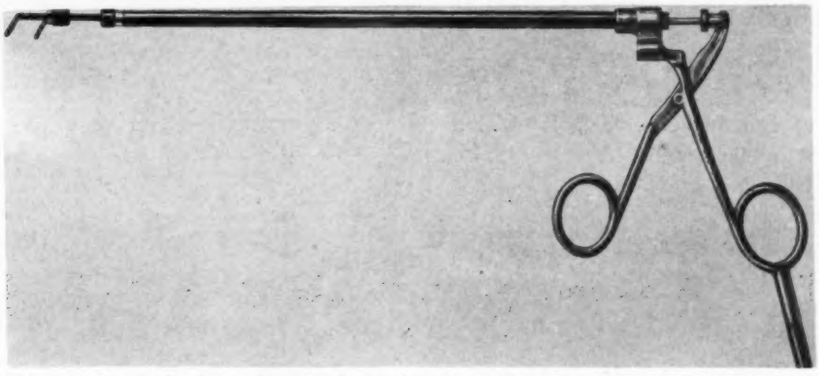


FIG. 11. Lateral view of author's double loop electric resector. (Courtesy of *Surgery*, C. V. Mosby Co.)

amputating the tumor cleanly and efficiently. In addition the raw base may be lightly coagulated with a monopolar current. When looping of the pedicle is technically impossible, the stalk near the base is clamped with a suitable clamp (Fig. 8) and electrically activated until the pedicle of the polyp is thoroughly charred. Subsequently the coagulated stalk with the polypoid mass sloughs off, thus producing a delayed but effective amputation of the polyp.

The small and sometimes medium-sized adenomas may be removed with a cold, angulated, biopsy forceps and followed by desiccation of the base with a monopolar current. (Fig. 9.) These lesions may also be destroyed *in situ* by application of a suitable electrode that is activated by a monopolar current, provided a preliminary biopsy had been secured. (Fig. 10.) (Electrocoagulation *in situ* is, however, not utilized for the destruction of villous or papillary adenomas.)

Large sessile adenomas may be removed by utilizing a double loop resector with a bipolar current. (Fig. 11.) To remove the tumor the open loops are placed on the neoplasm, the desired cutting current is applied and the loops are closed. (Fig. 12.) These maneuvers are repeated until all the intraluminal projection of the neoplasm is resected. The base of the tumor may be coagulated (using a monopolar current) at the conclusion of the resection or at a later date. Bleeding is usually prevented by the hemostatic effect of the cutting current or it may easily be controlled by coagulation with the same instrument by substituting the coagulating for the cutting current.[8]

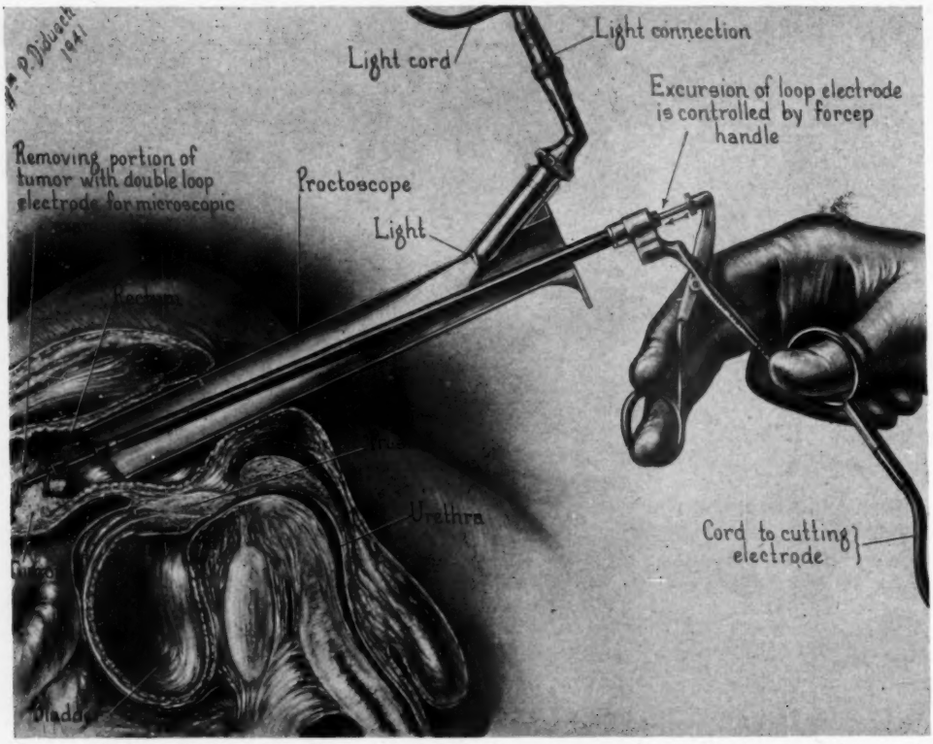
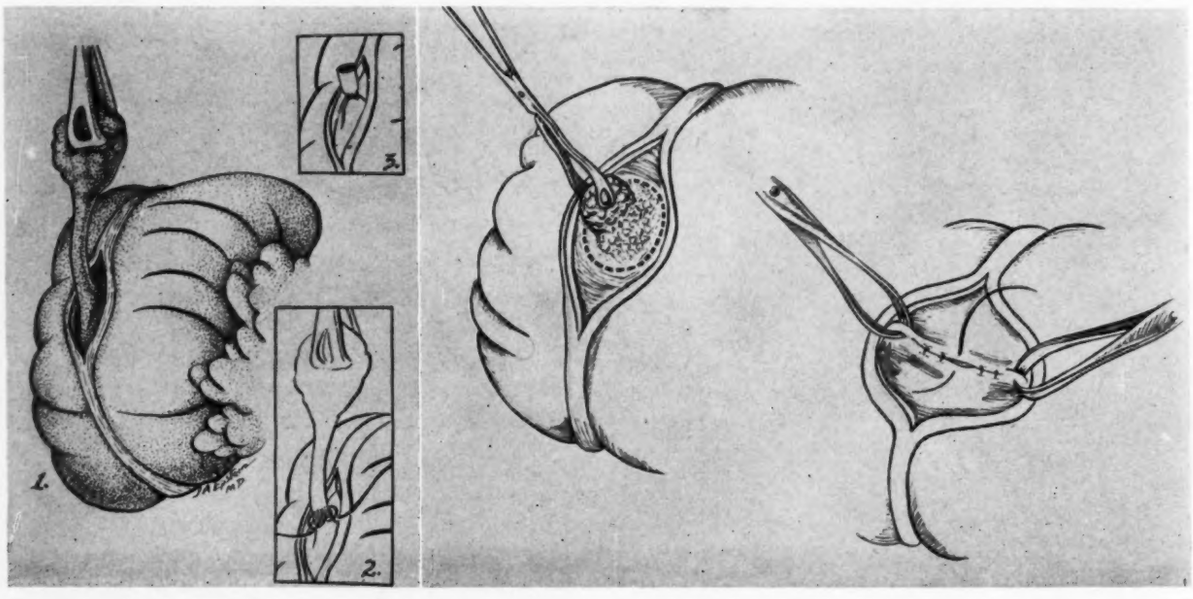


FIG. 12. Removal of sessile polyp with double loop resector. Note the travel of the proximal active loop. (Courtesy of *Surgery*, C. V. Mosby Co.)



A B

FIG. 13A, transcolonic extirpation of pedunculated adenoma; (1) incision and delivery of polyp; (2) application of ligature to stalk and (3) severance of pedicle well above the area of ligature. B, wide resection of base mucosal and submucosal with removal of polyp.

The smoke produced by surgical diathermy may be removed by suction. Either suction tubes or hollow electrodes that are attached to a suction apparatus may be utilized for this purpose. I prefer to eliminate this smoke through a suction tube that is incorporated in the sigmoidoscope. (Fig. 10.)

Pedunculated polyps situated at the rectosigmoid as well as those that are situated above the reach of the sigmoidoscope that cannot be safely extirpated instrumentally are removed through a transabdominal colotomy. The pedicle is crushed with an artery forceps above the base and tied. The stalk 1 cm. above the site of the ligature is then severed. (Fig. 13.) Colotomy with wide resection of mucosal base and submucosal structures may be employed for the removal of small and medium-sized sessile and short pedicled adenomas. (Fig. 13B.) (In some clinics the removed specimen is immediately examined microscopically to establish the presence or absence of invasion into the submucosa.) Segmental intestinal resection and end-to-end open anastomosis with or without a complementary proximal vent is usually utilized for the eradication of large sessile polyps.

Recurrence. Of twenty-seven patients with grossly sessile adenomatous polyps treated by surgical diathermy four showed small, benign, recurrent adenomas very close to or approximately at the site of previous fulguration within a period ranging between seven and sixteen months following the extirpation of the original adenomas. No recurrence has been observed in twenty-two patients with pedunculated adenomatous polyps. Of special interest is the absence of recurrence in four patients with pedunculated adenomas that contained focal carcinomatous transformation who have been followed and observed for over five years after the extirpation of the polyps by means of an electric snare. Three recent successful instances have been followed for less than one year.

SUMMARY AND CONCLUSIONS

Careful proctosigmoidoscopic examination of 386 individuals under forty-five years of age without intestinal symptoms revealed an incidence of about 2 per cent of adenomas exclusive of mucosal excrescences which are regarded as tiny adenomas by some authorities. A similar study of an equal number of somewhat older patients who complained of bleeding from the rectum revealed an incidence of about 7 per cent of adenomatous polyps. The advisability of sigmoidoscopy as part of a general physical examination is suggested.

While highly desirable, a long-range experimental study of adenomas by means of repeated sigmoidoscopic examinations and biopsies is apparently impractical.

The propensity of colonic adenomas to undergo malignant transformation makes the extirpation of these lesions mandatory.

The details of biopsy procurement and therapy are presented and illustrated.

REFERENCES

1. Turell, R. To be published.
2. Turell, R. New rectosigmoidal biopsy forceps. *Ann. Surg.*, 116: 637–639, 1942.
3. Atwater, J. S. and Bargen, J. A. Pathogenesis of intestinal polyps. *Gastroenterology*, 4: 395–408, 1945.
4. Buie, L. A. Remarks concerning malignant lesions, polypoid disease and diverticula of terminal portion of large intestine. *S. Clin. North America*, 26: 968–980, 1946.
5. Coller, F. A. and Berry, R. L. Cancer of colon. *J. A. M. A.*, 135: 1061–1067, 1947.
6. David, V. C. Symposium on surgical management of malignancy of colon; management of polyps occurring in rectum and colon. *Surgery*, 14: 387–394, 1943.
7. Helwig, E. B. Evolution of adenomas of large intestine and their relation to carcinoma. *Surg., Gynec. & Obst.*, 84: 36–49, 1947.
8. Turell, R. Double loop rectal resector and biopsy forceps. *Surgery*, 12: 729–730, 1942.

AUTHOR INDEX TO VOLUME LXXVI

Ackman, Douglas, 482
Altman, Leon S., 281
Altman, Vladimir, 434
Autry, Daniel H., 205
Aurin, Fred B., 586

Bachhuber, Carl A., 144
Bacon, Harry E., 648
Baker, Dan R., 515
Barnes, J. Peyton, 323
Barrett, Channing W., 284
Beck, Alfred C., 453
Beck, Erwin, 429
Becker, George L., 752
Begg, Charles, 188
Benjamin, Durand, 338
Berg, Ralph, 219
Bernstein, William C., 694
Berwald, William P. E., 298
Best, R. Russell, 654
Bierman, William, 232
Birchall, Robert, 51
Bisgard, J. Dewey, 610
Bleyer, Leo F., 448
Blotner, Carl, 446
Bosworth, Boardman Marsh, 472
Breidenbach, Lester, 578
Brekke, Viola G., 315
Brown, James Barrett, 625
Brown, W. A., 594
Brues, Austin M., 563
Burk, Lloyd B., Jr., 404

Call, Richard A., 427
Cannaday, John E., 502
Cantor, Meyer O., 364
Carlquist, John H., 92
Casberg, Melvin A., 172
Cattell, Richard B., 733
Cheleden, John, 754
Clark, Bliss B., 66
Cloward, Ralph B., 313
Colclough, J. A., 443
Cole, Frank R., 38
Coley, Bradley L., 15
Collica, Ignazio, 424
Coray, Q. B., 92
Cottam, Geoffrey, 23
Cowett, Max P., 770
Crastnopol, Philip, 412
Cunha, Felix, 244

Dangremond, Gerrit, 368
Davis, Kemp, 89
Dearing, Arthur H., 541
De Palma, A. F., 274
Douglass, Louis H., 378

Echols, Dean H., 443
Esling, Robert H., 364
Etsten, B., 268

Fansler, Walter A., 713
Farmer, A. W., 594
Ficarra, Bernard J., 201
Franks, W. R., 594
Freund, Samuel J., 286
Friedman, M. H. F., 709
Fryer, Minot P., 625
Frykman, Howard M., 713
Fusaro, William J., 332

Gallagher, John T. F., 525
Gandy, Joe R., 605
Garcia, Celso R., 332
Garrett, Sherman S., 261
Gaston, Eugene A., 119
Gates, Claudius Y., 319
Gerendasy, Julius, 774
Gerrie, John, 490
Gessler, C. N., 398
Ghormley, Ralph K., 496
Gilbert, Alfred E., 144
Gilbert, Richard A., 427
Glassman, Jacob A., 346
Glover, Donald M., 547
Goeringer, C. Fred, 58
Goldberg, David, 224
Goldberger, Emanuel, 412
Gordon, J. Berkeley, 393
Gordon, Joseph B., 89
Gurd, Fraser B., 506
Gurdjian, E. S., 235

Hamilton, G. Johnson, 672
Harmon, Paul H., 515
Haskell, Benjamin, 709
Hass, George M., 44
Hegner, Casper F., 461
Helwig, Ferdinand C., 728
Herrmann, Louis G., 586
Hicken, N. Frederick, 92
Hill, John R., 642
Himwich, H. E., 268
Householder, Raymond, 368
Hucherson, Denman C., 605

Jackson, Richard L., 110
Jenkins, James T., 763
Jenney, John A., 3

Kallet, Herbert I., 750
Kaplan, Abraham, 102
Kennedy, G. R., 429
Kerr, Jack G., 667
Kisner, Wendell H., 76
Klein, Russell R., 723
Knott, E. K., 165
Kogut, Benjamin, 281
Kretschmer, Herman L., 99
Kron, W. L., 354

Laird, Donald R., 701
Lam, Conrad R., 1
Lawrence, Howard C., 440
Lawrence, Knowles B., 29
Lebovitz, Julius, 107
Levinson, Lorman L., 378
Lewis, Benjamin, 15
Livingston, W. K., 537
Lord, Jere W., Jr., 578

Mann, Norman, 434
Marbury, William B., 110
Marcus, Raymond M., 412
Martin, Walter P., 172
Masland, Harvey C., 83
McDaniel, John R., 29
McGowan, John M., 205
McLaughlin, Charles W., Jr., 306
McLaughlin, Harrison L., 528
McNealy, Raymond W., 346, 646

Metz, Arthur R., 368
Migliaccio, A. V., 188
Miller, David, 769

Neer, Charles S., 528
Newell, Cecil E., 466
North, John Paul, 631
Novak, Emil, 352

Ostrove, Lester, 412

Palmer, Louis H., 211
Parsons, R. P., 559
Phaneuf, Louis E., 233
Phelps, Everett R., 364
Pratt, Gerald H., 87
Procita, Leonard, 440

Quinn, Martin L., 289

Raaf, John, 567
ReBell, F. George, 678
Redding, Marion D., 286
Reno, Joseph H., 515
Ricci, J. V., 354
Robillard, Gregory L., 332
Robinson, John R., 383
Ross, Stuart T., 687
Rushmer, Robert F., 44

Sainburg, Frank P., 113
Saint, James H., 121
Savini, Carlo, 222
Scannell, Raymond C., 124
Scarborough, Robert A., 723
Scheffler, W. A., 767
Schomaker, Theodore P., 319
Sciaroni, George H., 150
Seelig, M. G., 272
Shefts, Lawrence M., 29
Smith, Frederick, 482
Smith, Newton D., 642
Smith, Wilmer C., 619
Steiner, Charles A., 211
Stevenson, Vernon L., 92
Strauch, Clauss B., 197
Summers, John E., 72
Swenson, S. A., Jr., 610
Swindler, Charles M., 182

Thiele, George H., 637
Thom, C. H., 354
Turell, Robert, 89, 783

Vasko, John R., 328
Vaughan, George D., 648

Ward, Grant E., 349
Webster, John E., 235
Weisberg, A. Lester, 116
West, John P., 215
Witter, Joseph A., 315
Wolfe, Francis D., 646
Wolfson, Samuel, 66
Wright, Myron, 215

Young, Vincent T., 748

Zeidman, Herman M., 69

SUBJECT INDEX TO VOLUME LXXVI

(E.) = Editorial

Abdomen, traumatic condition of, 368
Adenocarcinoma, colloid, of anus, rectum or colon, 642
Adenomas, colonic, 783
Adhesive, duo liquid, in neurosurgery, 313
Aluminum foil in burn therapy, 594
Amputation
  for gangrene, 393
  of extremities, 610
  traumatic, of thigh, 328
Anesthesia
  local, for ganglion block, 66
  pentothal, anoxia during, 268
  refrigeration, 393
Anoxia, management of, during anesthesia, 268
Anuria, reflex, and procaine sympathetic block, 205
Anus, adenocarcinoma of, 642
Appendix
  calcified mucocele of, 323
  carcinoid tumor of, 434
  epiploic, 110
Arm, electric burns of, 631
Arteries, carotid, wounds of, 29
Atom bombs and trauma, 559, 563

Balloons, intestinal, and hydrogen sulfide, 364
Bile peritonitis, generalized, 466
Block, ganglion, with local anesthetics, 66
Blood
  irradiation, ultraviolet, 165
  placental, and placental extract, 38
Bowel
  large, carcinoma of, 646
  lesions of, 648
Brain
  damage to, and burns, 631
  reversal of circulation of, 150
Burns
  electric, of head and arm, with damage to eye and brain, 631
  treatment of, 547
  use of aluminum foil for, 594

Calculus rectal, 752
Cancer, radical surgery in (E.), 1
Carcinoma
  of bowel, operation for, 646
    rectum and rectosigmoid, 654
      operation for, 281
Care of fractures, ways of getting into trouble in, 506
Cecum, carcinoid tumors of, 434
Changes of appendices epiploicae, 110
Chemotherapy in wounds and infections, 482
Childhood
  acute intussusception in, 306
  polyposis of colon in, 667
Chorionepithelioma, hydatidiform mole and (E.), 352
Circulation of brain, reversal of, 150
Clamp for closure of duodenum in gastric resection, 346
Cleavage planes in vaginal plastic surgery, 354
Colitis
  ulcerative, and intestinal extract, 709
    treatment of, 713
Colon
  adenomas of, 783
  foreign bodies in, 678
  lipoma of, 116
  polypoid lesions of, 723
  polyposis of, in children, 667
  sigmoid, adenocarcinoma of, 642
  stricture of, 767
Continuity, arterial, restoration and preservation of, 578
Craniectomy for osteomyelitis of skull, 443
Curvature, greater, ulcer of, 429
Cystadenoma lymphomatosum, papillary, 440
Cysts
  calcified, of spleen, 315
  enterogenous, in vitelline duct, 113
  of duodenum and intestinal obstruction, 92
  pia-arachnoidal, of fossa, 102
  pilonidal, marsupialization for, 286

Deformity, fracture, 83
Derangements of knee and joint changes, 496
Diagnosis, early of hyperparathyroidism, 404
Disease
  acute, of portal vein, 398
  Hodgkin's, of stomach, 219
Diverticulum
  gastric, 172
  Meckel's, 69, 188
Drip anesthesia, intravenous, with pentothal sodium, 23
Duct, vitelline, cyst in, 113
Duo liquid adhesive in neurosurgery, 313
Duodenum
  clamp for closure of, 346
  cysts of, 92

Embolism, pulmonary, and injury to extremities, 586
Embryoma of testicle, 99
Episiotomy, errors and evils of, 284

Estrone in oil, injection of, in pregnancy test, 261
Extract, intestinal, and ulcerative colitis, 709
Extremities
  amputation of, 610
  infections of, 427
  injury to, with thrombosis and embolism, 586
Eyes, damage to, and burns, 631

Face, compound injuries to, 625
Fads and fancy in treatment of peptic ulcer, 244
Fecalith in cecal haustration with necrosis, 446
Femur
  fractures of, and internal fixation, 515
  intracapsular fractures of, 528
  neck of, fractures of, 525
Fistula
  biliary, spontaneous healing of, 222
  complicated, treatment of, 701
Fixation
  internal, metallic, holding powers of, 515
    with Smith-Petersen nail, 528
  percutaneous, of hip fractures, 197
Foreign bodies in colon and rectum, 678
Fossa, pia-arachnoidal cysts of, 102
  care of, and ways of getting into trouble, 506
  deformity, reduction of, 83
  fresh, of neck of femur 525
  intracapsular, of neck of femur, 528
  metacarpal, new instrument for, 224
  of femur, internal fixation for, 515
    hip, fixation of, 197
    humerus, 83
  severe, hypoproteinemia in, 201
Funiculitis, filarial, 15

Gallbladder, rupture of, 466
Gallstone, silent (E.), 121
Ganglion block with local anesthetics, 66
Gangrene, arteriosclerotic, amputations for, 393
Gastrectomy, total, for polyposis of stomach, 211
Gentian violet and pruritus ani, 763
Grafting, skin, 3

Harvard Medical School, 344
Haustration, cecal, fecalith in, 446
Head
  electric burns of, 631
  injuries, treatment of, 298
  neoplasms of (E.), 349
Healing
  of wounds, placental extract in, 38
  spontaneous, of biliary fistula, 222
Heart, wounds of, 412
Hemangiomas of muscle, 58
Hematoma, extradural, 567
Hemorrhage, shock due to, 182
Hemorrhoids
  sclerosing agent for, 770
  treatment of, 672
Hernia
  inguinal, and funiculitis, 15
  intra-abdominal, 107
Herniation
  lumbar, of nucleus pulposus, 235
  of fascial fat and low back pain, 605
Hip fractures, fixation of, 197
Hodgkin's disease of stomach, 219
Humerus, fracture of, 83
Hydatidiform mole and chorionepithelioma (E.), 352
Hydrogen sulfide, effect of, on balloons of decompression tubes, 364
Hyperparathyroidism, analysis of, 404
Hypoproteinemia, transitory, in fractures, 201

Ice for infections of extremities, 427
Incontinence, anal, plastic repair for, 89
Infancy, acute intussusception in, 306
Infection
  chemotherapy in, 482
  of extremities, 427
  perianal, in tuberculosis, 774
Infusion valve for biologic fluids, 232
Injuries
  crash, in man and animals, 44
  facial, compound, 625
  head, treatment of, 298
  to extremities with thrombosis and embolism, 586
    peripheral nerves, 537
Insertion of Smith-Petersen pin, 289
Intestine
  large, polyps of, 733
  sarcoma of, with skin manifestations, 215
  small, perforation of, 472
Intussusception, acute, in infancy, 306
Irradiation, blood, 165

Jaundice, 144
Joint changes in derangements of knee, 496

Knee, derangements of, and joint changes, 496

Lacerations, perineorrhaphy for (E.), 233
Lesions
  of large bowel, surgery of, 648
  polypoid, of colon and rectum, 723
    the pathologist, 728
Lipoma of colon and intestinal obstruction, 116
Lithiasis, urinary, pathogenesis, 424
Liver, rupture of, 466
Loop, mid-gut, failure of rotation of, 332
Lung, technic for resection of lobes of, 124

Lymphoma, benign, of rectum, 769
Lymphopathia stricture of rectum, 767

Marsupialization for pilonidal cyst and sinuses, 286
Meckel's diverticulum, 69, 188
Metastasis and paraganglioma, 748
Mucocele, calcified, of appendix, 323
Muscle, striated, hemangiomas of, 58

Neck, neoplasms of (E.), 349
Necrosis and fecalith in cecal haustration, 446
Neoplasms of head and neck (E.), 349
Nerves, peripheral, injuries to, 537
Neurosurgery, use of duo liquid adhesive in, 313
Norton extraperitoneal sections, 378
Nucleus pulposus, lumbar herniations of, 235

Obstetrics, today, yesterday and tomorrow in (Bo.B.), 453
Omentum, undetached, use of, in surgery, 502
Operation
  for carcinoma of rectum, 281
    varicose vens, 72
Osteomyelitis of skull, 443
Oxygen therapy in surgery, 76

Pain, low back, and herniation of fascial fat, 605
Papillae, anal, development of, 750
Paraganglioma, retrorectal, with metastasis, 748
Paralysis and reversal of circulation of brain, 150
Pathogenesis of urinary lithiasis, 424
Pathogens
  gram-negative, in reconstructive surgery, 490
    trauma, 482
Pathologist, rôle of, in lesions of colon and rectum, 728
Penicillin, intra-arterial, for infections of extremities, 427
Pentothal
  anesthesia, anoxia during, 268
  sodium for drip anesthesia, 23
Perforation of small intestine with non-penetrating trauma, 472
Pericardium, wounds of, 412
Perineorrhaphy for complete lacerations (E.), 233
Peritonitis, bile, and rupture of gallbladder, 466
Pin, Smith-Petersen, insertion of, 289
Planes, cleavage, in vaginal plastic surgery, 354
Plastic repair for anal incontinence, 89
Polyposis
  of colon in children, 667
    stomach and total gastrectomy, 211
Polyps of large intestine, 733
Powder, talcum, evil of, 272
Pregnancy test, new, 261
Presidential address (E.), 461
Procaine block in reflex anuria, 205
Proctology
  as a surgical specialty, 637
  in U. S. Veterans Hospital, 694
Pruritus ani and gentian violet, 763
Pseudohermaphroditism, 448

Rectosigmoid procedure for carcinoma of, 654
Rectum
  adenocarcinoma of, 642
  calculus of, 752
  carcinoma of, 281
  foreign bodies in, 678
    lymphoma of, 769
  polypoid lesions of, 723
    and the pathologist, 728
  procedure for carcinoma of, 654
    stricture of, 767
Reduction of metacarpal fractures, instrument for, 224
Refrigeration anesthesia, 393
Resection
  gastric, clamp for closure of duodenum in, 346
  of lobes of lung, 124
Restoration of arterial continuity, 578
Retractor, self-retaining, for abdominal wall, 119
Reversal of circulation of brain, 150
Rotation of mid-gut loop, failure of, 332
Rupture
  of gallbladder and liver, 466
  spontaneous, of normal spleen, 319

Sacral and presacral tumors, 687
Sarcoma, lymphoblastic, of small intestine, and skin manifestations, 215
Scalenus anticus syndrome, surgery and traction for, 274
Sections, extraperitoneal, 378
Shock
  caused by extremity wounds, 51
  hemorrhagic, 182
Sinuses, pilonidal, marsupialization for, 286
Skin
  grafting, free, 3
  manifestations in sarcoma of intestine, 215
Skull, osteomyelitis of, 443
Smith-Petersen
  pin for internal fixation, 528
    insertion of, 289
Sphincter, preservation of, in rectal carcinoma, 281
Spleen
  calcified cyst of, 315
  normal, rupture of, 319
Splints, fixation, 83
Stomach
  Hodgkin's disease of, 219
  polyposis of, 211
  ulcer of greater curvature of, 429
Streptococcus, hemolytic, and ulceration, 754
Stricture of rectum and colon, 767

Surgery
of lesions of large bowel, 648
neoplasms of head and neck (E.), 349
scalenus anticus syndrome, 274
trauma, 619
oxygen therapy in, 76
radical, in cancer (E.), 1
reconstructive, gram-negative pathogens in, 490
use of omentum in, 502

Talcum powder evil, 272

Technic for resection of lobes of lung, 124
Tendon, repair of, with wire, 87
Test, new pregnancy, 261
Testicle, embryoma of, 99
Thigh, amputation of, 328
Thrombosis
mesenteric, 338
venous, and pulmonary embolism, with injury to extremities, 586
Traction, skeletal, for scalenus anticus syndrome, 274
Transition in burn treatment, 547
Trauma
handling of, in Navy, 541
non-penetrating, and perforation of intestine, 472
resulting from atom bombs, 559, 563
surgery of, 619
to abdomen, 368
Treatment
of complicated fistulas, 701
head injuries and their sequelae, 298
hemorrhoids, 672
polyps of large intestine, 733
ulcerative colitis, 713
Tuberculosis and perianal infection, 774
Tubes, decompression, and hydrogen sulfide, 364
Tumor
carcinoid, of appendix and cecum, 434
papillary, 440
sacral and presacral 687

Ulcer
benign, of curvature of stomach, 429
chronic, of perineum, and hemolytic streptococcus, 754
peptic, fads in treatment of, 244
Ultraviolet blood irradiation, development of, 165

Vagina, plastic surgery of, 354

Valve, infusion, for biologic fluids, 232
Vein
portal, disease of, 398
varicose, operation for, 72

War injuries to peripheral nerves, 537

Water balance, developments in, 383
Wire for tendon repair, 87
Wounds
chemotherapy in, 482
healing, placental extract in, 38
of carotid arteries, 29
extremity and shock, 51
heart and pericardium, 412

The American Journal of Surgery

Editor: THURSTON SCOTT WELTON, M.D, NEW YORK

Associate Editors: BRADLEY L. COLEY, *New York;* ARNOLD S. JACKSON, *Madison;*
E. ERIC LARSON, *Los Angeles*

ADVISORY BOARD

CLAUDE S. BECK, *Clev.;* GEO. R. BRIGHTON, *N.Y.;* MEREDITH F. CAMPBELL, *N.Y.;* JAMES T. CASE, *Chicago;* ISIDORE COHN, *N.O.* FREDERICK A. COLLER, *Ann Arbor;* PAUL C. COLONNA, *Phila.;* GORDON S. FAHRNI, *Winnipeg;* HERBERT C. FETT, *Brooklyn;* EMIL GOETSCH, *Brooklyn;* CHARLES A. GORDON, *Brooklyn;* DONALD GUTHRIE, *Sayre, Pa.;* LOUIS J. HIRSCHMAN, *Detroit;* EMILE F. HOLMAN, *San Francisco;* CLAUDE J. HUNT, *Kansas City;* T. J. KIRWIN, *N.Y.;* ARTHUR KRIDA, *N.Y.;* A. V. S. LAMBERT, *N.Y.;* JEROME M. LYNCH, *N.Y.;* URBAN MAES, *N.O.;* HARRISON S. MARTLAND, NEWARK, *N.J.;* RUDOLPH MATAS, *N.O.;* ROY D. MCCLURE, *Detroit;* D. W. GORDON MURRAY, *Toronto;* H. C. NAFFZIGER, *San Francisco;* EMIL NOVAK, *Balt.;* CLARENCE R. O'CROWLEY, *Newark, N.J.;* LOUIS E. PHANEUF, *Boston;* JAMES T. PRIESTLEY, *Rochester, Minn.;* N. P. RATHBURN, *Brooklyn;* HUBERT A. ROYSTER, *Raleigh;* HENRY S. RUTH, *Phila.;* ROBERT L. SANDERS, *Memphis;* GRANT E. WARD, *Baltimore;* J. H. WOOLSEY, *San Francisco.*

NEW SERIES, VOLUME LXXVI

JULY TO DECEMBER

1948

PUBLISHED MONTHLY BY

THE YORKE PUBLISHING COMPANY, INC.

49 WEST 45TH STREET, NEW YORK 19, N. Y.

MCMXLVIII

COPYRIGHT, 1948
BY THE YORKE PUBLISHING COMPANY, INC.
All Rights Reserved

Printed in the United States of America

CONTENTS OF VOLUME LXXVI

ORIGINAL ARTICLES

Free Skin Grafting	*John A. Jenney*	3
Filarial Funiculitis. Report of a Case Discovered at Operation for Inguinal Hernia	*Bradley L. Coley* *Benjamin Lewis*	15
Intravenous Drip Anesthesia with Pentothal Sodium. A Report of 7,694 Cases	*Geoffrey Cottam*	23
Wounds of Common Carotid Arteries. Report of Seventeen Cases from World War II	*Knowles B. Lawrence* *Lawrence M. Shefts* *John R. McDaniel*	29
Placental Blood and Placental Extract in Wound Healing	*Frank R. Cole*	38
Comparison of Crash Injuries in Man and in Laboratory Animals	*Robert F. Rushmer* *George M. Hass*	44
Shock Caused by Extremity Wounds	*Robert Birchall*	51
Hemangiomas of Striated Muscle	*C. Fred Goeringer*	58
Therapeutic Stellate Ganglion Block Using Local Anesthetics	*Bliss B. Clark* *Samuel Wolfson*	66
Meckel's Diverticulum	*Herman M. Zeidman*	69
Technic of Operation for Varicose Veins	*John E. Summers*	72
Oxygen Therapy in Surgery	*Wendell H. Kisner*	76
Fracture Deformity Reduction and Fixation Splints. Linear Fracture through the Head of the Humerus	*Harvey C. Masland*	83
Tendon Repair with Steel Wire	*Gerald H. Pratt*	87
Plastic Repair for Postoperative Anal Incontinence	*Major Robert Turell* *Lieut. Colonel Joseph B. Gordon* *Colonel Kemp Davis*	89
Multiple Duplicative Cysts of the Duodenum Causing Acute Intestinal Obstruction in a Girl Five and One-half Years of Age	*N. Frederick Hicken* *Vernon L. Stevenson* *John H. Carlquist* *Q. B. Coray*	92
Embryoma of the Testicle in a Five-year Old Child	*Herman L. Kretschmer*	99
Pia-arachnoidal Cysts of the Posterior Fossa	*Abraham Kaplan*	102
Intra-abdominal Hernia	*Julius Lebovitz*	107
Pathologic Changes of the Appendices Epiploicae	*William B. Marbury* *Richard L. Jackson*	110
Enterogenous Cyst in an Aberrant Vitelline Duct	*Frank P. Sainburg*	113

Lipoma of the Colon Causing Intestinal Obstruction	*A. Lester Weisberg*	116
Self-retaining Retractor for the Superficial Layers of the Abdominal Wall	*Eugene A. Gaston*	119
Technic for Resection of the Right Middle and Right Lower Lobes of the Lung	*Raymond C. Scannell*	124
Four Hundred Consecutive Cases of Jaundice	*Carl A. Bachhuber* *Alfred E. Gilbert*	144
Reversal of Circulation of the Brain. Partial Reversal in Four Humans Treated for Paralysis and Mental Conditions	*George H. Sciaroni*	150
Development of Ultraviolet Blood Irradiation	*E. K. Knott*	165
Gastric Diverticula	*Melvin A. Casberg* *Walter P. Martin*	172
Hemorrhagic Shock	*Charles M. Swindler*	182
Meckel's Diverticulum	*A. V. Migliaccio* *Charles Begg*	188
Percutaneous Fixation of Hip Fractures	*Clauss B. Strauch*	197
Transitory Hypoproteinemia in Acute Severe Fractures	*Bernard J. Ficarra*	201
Reflex Anuria. Its Treatment by Procaine Sympathetic Block	*John M. McGowan* *Daniel H. Autry*	205
Polyposis of the Stomach Treated by Total Gastrectomy	*Charles A. Steiner* *Louis H. Palmer*	211
Lymphoblastic Sarcoma of the Small Intestine with Primary Manifestations in the Skin	*John P. West* *Myron Wright*	215
Hodgkin's Disease of the Stomach	*Ralph Berg*	219
Spontaneous Healing of an External Biliary Fistula	*Carlo Savini*	222
Metacarpal Fractures. Modification of a New Instrument for the Maintenance of Position after Reduction	*David Goldberg*	224
A Three-way Infusion Valve for Biologic Fluids	*William Bierman*	232
Lumbar Herniations of the Nucleus Pulposus. An Analysis of 196 Operated Cases	*E. S. Gurdjian* *John E. Webster*	235
Fads and Fancy in Treatment of Peptic Ulcer	*Felix Cunha*	244
New Pregnancy Test. Use of Three Injections of Estrone in Oil	*Sherman S. Garrett*	261
Management of Anoxia during Pentothal Anesthesia	*B. Etsten* *H. E. Himwich*	268
The Talcum Powder Evil	*M. G. Seelig*	272
Scalenus Anticus Syndrome Treated by Surgery and Skeletal Traction	*A. F. De Palma*	274
Modified Operation for Carcinoma of the Rectum with Preservation of the Sphincter	*Leon S. Altman* *Benjamin Kogut*	281

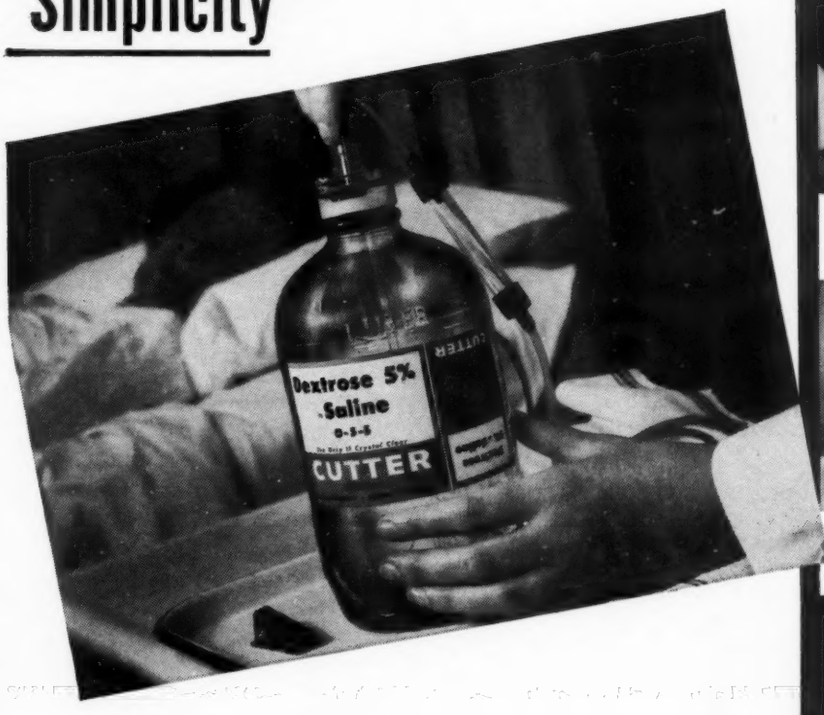
Errors and Evils of Episiotomy	*Channing W. Barrett*	284
Marsupialization. A Surgical Procedure for the Eradication of Pilonidal Cyst and Sinuses	*Samuel J. Freund* *Marion D. Redding*	286
Insertion of the Smith-Petersen Pin	*Martin L. Quinn*	289
Treatment of Head Injuries and Their Sequelae	*William P. E. Berwald*	298
Acute Intussusception in Infancy and Childhood	*Charles W. McLaughlin, Jr.*	306
Duo Liquid Adhesive. Its Uses in Neurosurgery	*Ralph B. Cloward*	313
Solitary Calcified Cyst of the Spleen	*Joseph A. Witter* *Viola G. Brekke*	315
Spontaneous Rupture of the Normal Spleen	*Theodore P. Schomaker* *Claudius Y. Gates*	319
Calcified Mucocele of the Appendix	*J. Peyton Barnes*	323
Subcutaneous, Subtotal Traumatic Amputation of a Thigh	*John R. Vasko*	328
Failure of Rotation of Mid-gut Loop	*Gregory L. Robillard* *William J. Fusaro* *Celso R. Garcia*	332
Mesenteric Thrombosis	*Durand Benjamin*	338
Harvard Medical School		344
A New Clamp Designed to Facilitate Closure of the Duodenum in Gastric Resection	*Raymond W. McNealy* *Jacob A. Glassman*	346
Cleavage Planes in Reconstructive Vaginal Plastic Surgery	*J. V. Ricci* *C. H. Thom* *W. L. Kron*	354
Effect of Hydrogen Sulfide upon the Balloons of Intestinal Decompression Tubes. An Experimental Study	*Meyer O. Cantor* *Everett R. Phelps* *Robert H. Esling*	364
The Traumatic Condition of the Abdomen	*Arthur R. Metz* *Raymond Householder* *Gerrit Dangremond*	368
Experience with the Norton Extraperitoneal Sections	*Lorman L. Levinson* *Louis H. Douglass*	378
Recent Developments in Water Balance	*John R. Robinson*	383
Experience with Refrigeration Anesthesia. Six Supracondylar Amputations for Arteriosclerotic Gangrene	*J. Berkeley Gordon*	393
Acute Disease of the Portal Vein	*C. N. Gessler*	398
Hyperparathyroidism. An Analysis of Ten Cases with Special Reference to Earlier Diagnosis	*Lloyd B. Burk, Jr.*	404
Wounds of the Heart and Pericardium	*Philip Crastnopol* *Emanuel Goldberger* *Raymond M. Marcus* *Lester Ostrove*	412
New Concept of the Pathogenesis of Urinary Lithiasis	*Ignazio Collica*	424

Treatment of Infections of the Extremities. Clinical Results Obtained with a Combination of Ice, Tourniquet and Intra-arterial Penicillin	*Richard A. Gilbert* *Richard A. Call*	427
Benign Ulcer of the Greater Curvature of the Stomach	*G. R. Kennedy* *Erwin Beck*	429
Metastasizing Carcinoid Tumor of the Appendix and Cecum	*Vladimir Altman* *Norman Mann*	434
Papillary Cystadenoma Lymphomatosum. Bilateral Involvement	*Howard C. Lawrence* *Leonard Procita*	440
Subtotal Craniectomy for Osteomyelitis of the Skull	*Dean H. Echols* *J. A. Colclough*	443
Trapped Fecalith in Cecal Haustration with Local Necrosis	*Carl Blotner*	446
Pseudohermaphroditism. Report of Two Cases in the Same Family	*Leo F. Bleyer*	448
Today, Yesterday and Tomorrow in Obstetrics	*Alfred C. Beck*	453
Presidential Address	*Casper F. Hegner*	461
Traumatic Rupture of the Gallbladder and Liver. Report of a Case with Generalized Bile Peritonitis	*Cecil E. Newell*	466
Perforation of the Small Intestine from Non-penetrating Abdominal Trauma	*Boardman Marsh Bosworth*	472
Rôle of Chemotherapy in Wounds and Surgical Infections. A Study of the Significance of Gram-negative Pathogens in Fresh Trauma and Chronic Infections	*Douglas Ackman* *Frederick Smith*	483
Significance of Gram-negative Pathogens in Reconstructive Surgery	*John Gerrie*	490
Late Joint Changes as a Result of Internal Derangements of the Knee	*Ralph K. Ghormley*	496
Some Uses of Undetached Omentum in Surgery	*John E. Cannaday*	502
Twenty-five Easy Ways of Getting into Trouble in the Care of Fractures	*Fraser B. Gurd*	506
Experiments on the Holding Powers of Various Types of Metallic Internal Fixation for Transcervical Fractures of the Femur	*Paul H. Harmon* *Dan R. Baker* *Joseph H. Reno*	515
End Results in Seventy-seven Consecutive Fresh Fractures of the Neck of the Femur	*John T. F. Gallagher*	525
Intracapsular Fractures of the Neck of the Femur. Follow-up Report of 130 Patients Treated by Internal Fixation with the Smith-Petersen Nail	*Charles S. Neer* *Harrison L. McLaughlin*	528
Management of War Injuries to Peripheral Nerves	*W. K. Livingston*	537
Handling of Trauma in the United States Navy	*Rear Admiral Arthur H. Dearing*	541
Transition in Burn Treatment. The War Years	*Donald M. Glover*	547

Trauma Resulting from Atomic Explosions	*Captain R. P. Parsons*	559
Nature of Trauma in Atomic Warfare	*Austin M. Brues*	563
Massive Extradural Hematoma	*John Raaf*	567
Restoration and Preservation of Arterial Continuity Following Trauma	*Lester Breidenbach* *Jere W. Lord, Jr.*	578
Management of Venous Thrombosis and Pulmonary Embolism Following Injury to Extremities	*Fred B. Aurin* *Louis G. Herrmann*	586
Local Application of Aluminum Foil and Other Substances in Burn Therapy	*W. A. Brown* *A. W. Farmer* *W. R. Franks*	594
Herniation of Fascial Fat. A Cause of Low Back Pain	*Denman C. Hucberson* *Joe R. Gandy*	605
Amputation of Extremities	*S. A. Swenson, Jr.* *J. Dewey Bisgard*	610
End Results of Certain Procedures in the Surgery of Trauma	*Wilmer C. Smith*	619
Management of Compound Facial Injuries	*James Barrett Brown* *Minot P. Fryer*	625
Electric Burns of the Head and Arm with Residual Damage to Eyes and Brain	*John Paul North*	631
Present Status of Proctology as a Surgical Specialty in the United States	*George H. Thiele*	637
Colloid Adenocarcinoma Involving the Perianal Region, Anus Rectum or Sigmoid Colon	*John R. Hill* *Newton D. Smith*	642
Choice of Operation in Carcinoma of the Left Half of the Large Bowel	*Raymond W. McNealy* *Francis D. Wolfe*	646
Surgical Management of Lesions of the Large Bowel	*Harry E. Bacon* *George D. Vaughan*	648
Selection of Patients and Anastomotic Procedures for Carcinoma of Rectum and Rectosigmoid	*R. Russell Best*	654
Polyposis of the Colon in Children	*Jack G. Kerr*	667
Treatment of Hemorrhoids	*G. Johnson Hamilton*	672
The Problem of Foreign Bodies in the Colon and Rectum	*F. George ReBell*	678
Sacral and Presacral Tumors	*Stuart T. Ross*	687
Organization and Operation of a Department of Proctology in a U. S. Veterans Hospital. Some Experiences Gained from the First Year's Operation	*William C. Bernstein*	694
Procedures Used in Treatment of Complicated Fistulas	*Donald R. Laird*	701
One Year's Treatment of Non-specific Ulcerative Colitis with Intestinal Extract	*Benjamin Haskell* *M. H. F. Friedman*	709

Surgical Treatment of Non-specific Ulcerative Colitis	*Walter A. Fansler* *Howard M. Frykman*	713
Polypoid Lesions of the Colon and Rectum	*Robert A. Scarborough* *Russell R. Klein*	723
Role of the Pathologist in the Diagnosis of Polypoid Lesions of the Colon and Rectum	*Ferdinand C. Helwig*	728
Surgical Treatment of Polyps of the Large Intestine	*Richard B. Cattell*	733
Retrorectal Paraganglioma with Metastasis	*Vincent T. Young*	748
Anomalous Development of Anal Papillae	*Herbert I. Kallet*	750
Rectal Calculus of Unusual Size	*George L. Becker*	752
Chronic Burrowing Ulceration of the Perineum Due to Microaerophilic Hemolytic Streptococcus	*John Cheleden*	754
Pruritus Ani. A Study of Results with Gentian Violet in 210 Cases	*James T. Jenkins*	763
Lymphopathia Stricture of Rectum Complicated by Secondary Stricture of Ascending Colon of Probable Tuberculous Origin	*W. A. Scheffler*	767
Benign Lymphoma of the Rectum	*David Miller*	769
New Sclerosing Agent for Hemorrhoids. A Three-year Study	*Max P. Cowett*	770
Perianal Infection in the Tuberculous Patient. Clinical Notes	*Julius Gerendasy*	774
Colonic Adenomas	*Robert Turell*	783

Simplicity



in Dextrose Administration

Sterile, pyrogen-free solution is removed from stock and inspected for clarity.

Disposable intravenous set, already assembled and sterilized, saves time for nurses and other technicians.

Attending physician makes a final examination, to be certain solution checks with his written orders.

These photographs are from a newly-completed strip film, prepared for use in hospital training programs. For a print, write to Cutter Laboratories, Berkeley 1, California.

No involved procedures with Cutter Solutions in Saftiflasks! From meticulously tested solutions—to ready-to-use, disposable injection equipment—the Saftiflask set-up is designed for simple, trouble-free administration in your hospital.

CUTTER LABORATORIES · Berkeley 1, California

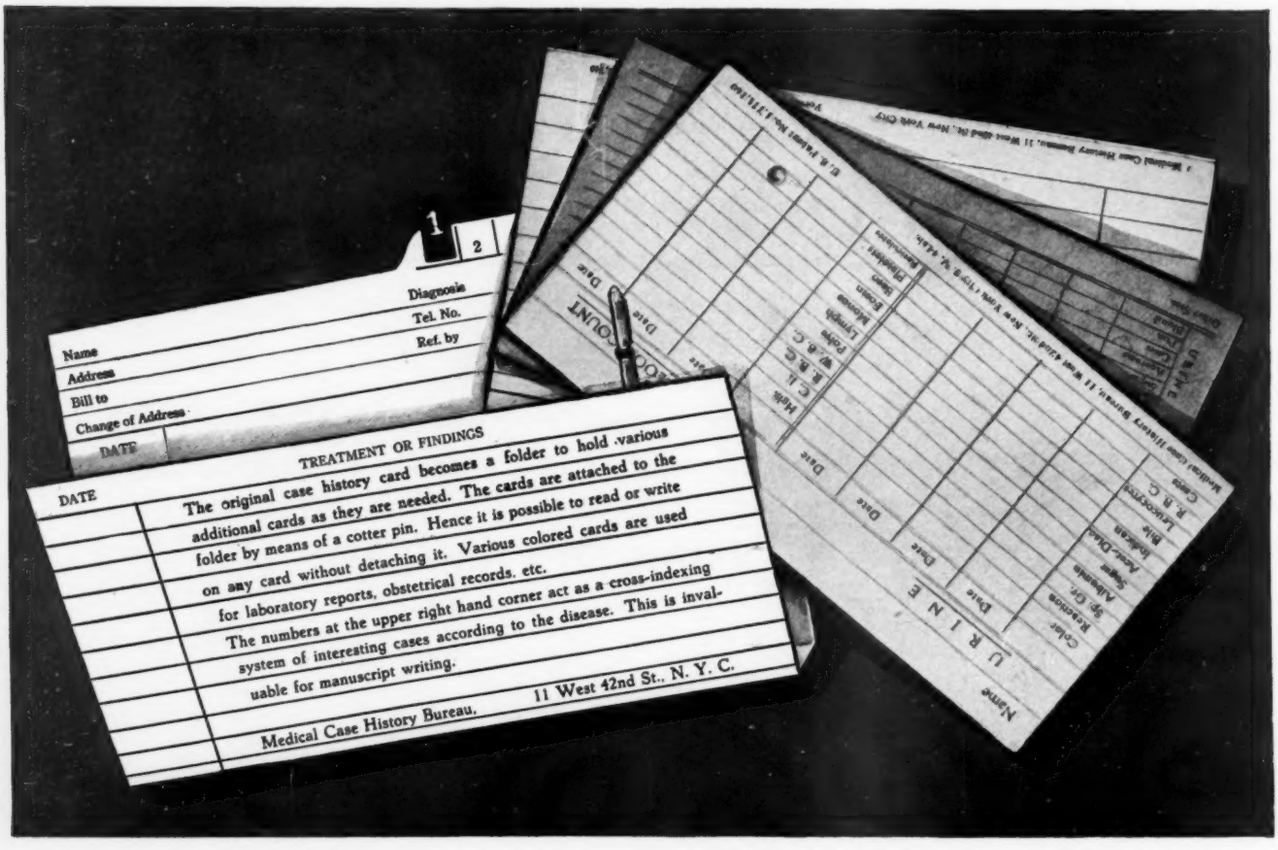
Outside the Ivory Tower

(*continued from page 24*)

DOCTORS and nurses today are finding themselves spending too much time keeping up records and clerical information on their patients. A handy, compact method for keeping complete case histories is illustrated in the accompanying figure. It shows a case history chart being used as a folder in which several subsequent visit cards are attached. A cotter pin holds the cards together in correct sequence. Note the ease of operation; no card can be detached or lost. Swing any card out and both sides are visible. Different color cards are available for different types of data. The numbers on the upper right corner are for diagnosis cross indexing which functions automatically. All cases of the same disease can be identified instantly. A keyguide with numbers is kept in front of the file. The diagnosis is written next to a number on the keyguide and a tab with the corresponding number is placed on the chart; while the history charts are filed alphabetically. Cases of the same disease have tabs of the same number and appear in one line in the file. The folder embodies a financial record with the case history chart, if preferred, or provides an efficient bookkeeping system separate from the histories, giving totals at a glance and requiring a minimum of clerical work. Remember, the diagnosis is in the history—"if" the history is complete. Sample cards for each specialty can be had by simply writing to Medical Case History Bureau, 11 W. 42nd St., New York 18, N. Y.

CURRENT hospital accomplishments in the treatment of cancer indicate that about 50 per cent of cancer cases, averaging all types, are definitely curable, the annual clinical congress of the American College of Surgeons was told.

This represents a tremendous improvement over the situation twenty-five years ago, when coordinated attacks on the disease were getting under way, and even over that of ten years ago, it was stated, Great strides in treatment in the last few years were reported through the application of wartime developments such as wholesale blood transfusions and penicillin for the performance of "massive" operations.


1
2
Name
Address
Bill to
Change of Address
Diagnosis
Tel. No.
Ref. by
DATE
TREATMENT OR FINDINGS
The original case history card becomes a folder to hold various additional cards as they are needed. The cards are attached to the folder by means of a cotter pin. Hence it is possible to read or write on any card without detaching it. Various colored cards are used for laboratory reports, obstetrical records, etc.
The numbers at the upper right hand corner act as a cross-indexing system of intereating cases according to the disease. This is invaluable for manuscript writing.
Medical Case History Bureau, 11 West 42nd St., N. Y. C.

Lanteen

FLAT SPRING DIAPHRAGM

Physician's package and complete description of the *New Technique* will be sent upon request.

Ethically promoted—Advertised only to the medical profession.

Accepted by the Council on Physical Medicine of the American Medical Association.

Easily Fitted—The Lanteen Flat Spring Diaphragm, collapsible in one plane only, is easily placed without an inserter.

Remains in Position—The flat spring rim of the Lanteen Diaphragm gently but firmly holds the diaphragm in place even during changes in body position.

Long Lasting—Lanteen Diaphragms, made of the finest rubber, are guaranteed against defects for a period of one year.

Lanteen

LANTEEN MEDICAL LABORATORIES, INC.

900 North Franklin Street, Chicago 10, Illinois

COOK COUNTY
GRADUATE SCHOOL OF MEDICINE

Announces continuous courses

SURGERY—Intensive Course in Surgical Technique, Two Weeks, Starting January 24, February 21.
Surgical Technique, Surgical Anatomy & Clinical Surgery, Four Weeks, Starting February 7, March 7.
Surgical Anatomy & Clinical Surgery, Two Weeks, Starting February 21, March 21.
Surgery of Colon & Rectum, One Week, Starting March 7, April 11.

GYNECOLOGY—Intensive Course, Two Weeks, Starting February 21, March 21.
Vaginal Approach to Pelvic Surgery, One Week, Starting February 14.

OBSTETRICS—Intensive Course, Two Weeks, Starting March 7.

MEDICINE—Intensive Course, Two Weeks, Starting April 4.
Personal Course in Gastroscopy, Two Weeks, Starting March 7.

PEDIATRICS—Intensive Course, Four Weeks, Starting April 4.

DERMATOLOGY—Formal Course, Two Weeks, Starting April 18.
Clinical Course Every Two Weeks.

CYSTOSCOPY—Ten Day Practical Course Every Two Weeks.

ROENTGENOLOGY—Lecture & Diagnostic Course, Two Weeks, Starting the First Monday of Every Month.
Clinical Course Starting Third Monday of Every Month.

GENERAL, INTENSIVE AND SPECIAL COURSES IN ALL BRANCHES OF MEDICINE, SURGERY AND THE SPECIALTIES

TEACHING FACULTY—ATTENDING STAFF
of Cook County Hospital

Address: Registrar, **427 South Honore Street, Chicago 12, Illinois**

THE NEW YORK POLYCLINIC
MEDICAL SCHOOL AND HOSPITAL

(ORGANIZED 1881)

(The Pioneer Post-Graduate Medical Institution in America)

UROLOGY

A combined full time course covering an academic year (8 months). It comprises instruction in pharmacology; physiology; embryology; biochemistry; bacteriology and pathology; practical work in surgical anatomy and urological operative procedures on the cadaver; regional and general anesthesia (cadaver); office gynecology; proctological diagnosis; the use of the ophthalmoscope; physical diagnosis; roentgenological interpretation; electrocardiographic interpretation; dermatology and syphilology; neurology; physical medicine; continuous instruction in cystoendoscopic diagnosis and operative instrumental manipulation; operative surgical clinics; demonstrations in the operative instrumental management of bladder tumors and other vesical lesions as well as endoscopic prostatic resection.

PROCTOLOGY AND GASTRO-ENTEROLOGY

A combined course comprising attendance at clinics and lectures; instruction in examination, diagnosis and treatment; witnessing operations; ward rounds; demonstration of cases; pathology; radiology; anatomy; operative proctology on the cadaver.

FOR THE GENERAL SURGEON

A combined surgical course comprising general surgery, traumatic surgery, abdominal surgery, gastro-enterology, proctology, gynecological surgery, urological surgery. Attendance at lectures, witnessing operations, examination of patients pre-operatively and post-operatively and follow-up in the wards post-operatively. Pathology, roentgenology, physical therapy, anesthesia. Cadaver demonstrations in surgical anatomy, thoracic surgery, proctology. Operative surgery and operative gynecology on the cadaver.

FOR THE GENERAL PRACTITIONER

Intensive full time instruction covering those subjects which are of particular interest to the physician in general practice. Fundamentals of the various medical and surgical specialties designed as a practical review of established procedures and recent advances in medicine and surgery. Subjects related to general medicine are covered and the surgical departments participate in giving fundamental instruction in their specialties. Pathology and radiology are included. The class is expected to attend departmental and general conferences.

FOR INFORMATION ADDRESS

MEDICAL EXECUTIVE OFFICER, 345 West 50th Street, NEW YORK 19

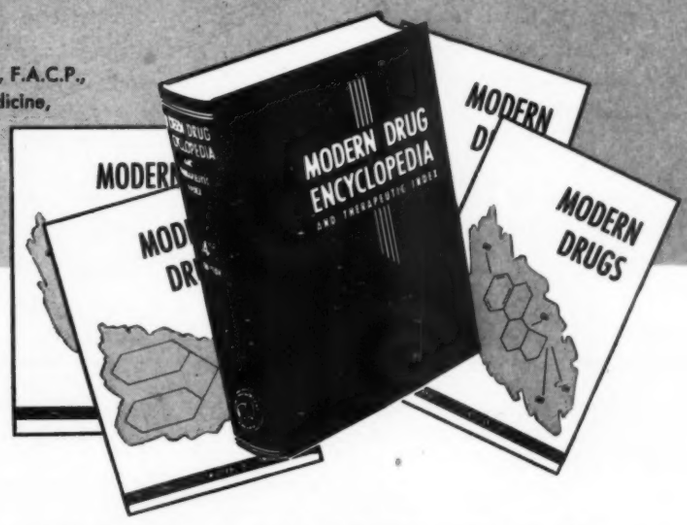
READY SOON

THE NEW, COMPLETELY REWRITTEN
1949 EDITION

Modern Drug Encyclopedia

AND THERAPEUTIC INDEX

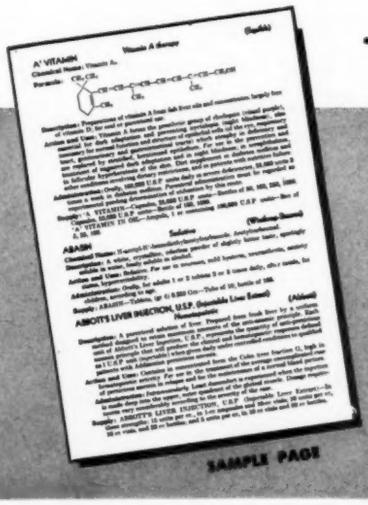
Edited by Marion E. Howard, M.D., F.A.C.P.,
Associate Clinical Professor of Medicine,
Yale University Medical School,
New Haven, Conn.



Bound in Red Fabricoid,
1,000 pages, Size 2"x6"x9"
Price postpaid $12 U. S. A.
$14 Foreign

At your fingertips

- The Composition, Action, Uses, Supply, Dosage, and Cautions of 3240 Ethical Drugs of 236 American Pharmaceutical Manufacturers.
- A Time-Saving Three-Way Index—Alphabetical, Therapeutic and by Manufacturers.
- Kept Up To Date With Four Supplements Yearly.


SAMPLE PAGE

PREPUBLICATION OFFER

MODERN DRUGS
Drug Publications, Inc.
49 West 45th St., New York 19, N. Y.

Enclosed is the sum of ten dollars ($10 U. S. A.) for which please send me postpaid the new Fourth Edition of the MODERN DRUG ENCYCLOPEDIA and THERAPEUTIC INDEX and MODERN DRUGS. (Remittance must accompany order).

Name .....

Address .....

City.....Zone.....State.....

U. S. A. $10 FOREIGN $12 SAVE $2 BY ORDERING NOW

THE GEORGE WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

Announces

Fourth Annual Series of Intensive Postgraduate Courses

Gynecology	February 21–25, 1949
Anesthesiology	February 28–March 4, 1949
Surgical Physiology	March 7–11, 1949
Abdominal Surgery	March 14–25, 1949
Bone and Joint Surgery	March 28–April 1, 1949
Neoplastic Diseases	April 4–8, 1949

A Distinguished Guest Faculty will Supplement the Local Staff

Numerous other courses are also available. Registration in each course is limited. Veterans can use their benefits under the G.I. Bill. Hotel accommodations are available.

For Further Details Write:

DIRECTOR OF POSTGRADUATE INSTRUCTION
The George Washington University School of Medicine
1335 H Street, N.W., Washington, D.C.

---

for the successful treatment of...

LEG ULCERS

the DAXALAN-DOME-PASTE BANDAGE TECHNIQUE as introduced by DR. WILLIAM M. COOPER, Director, Department of Peripheral Vascular Diseases—New York Polyclinic Medical School and Hospital.

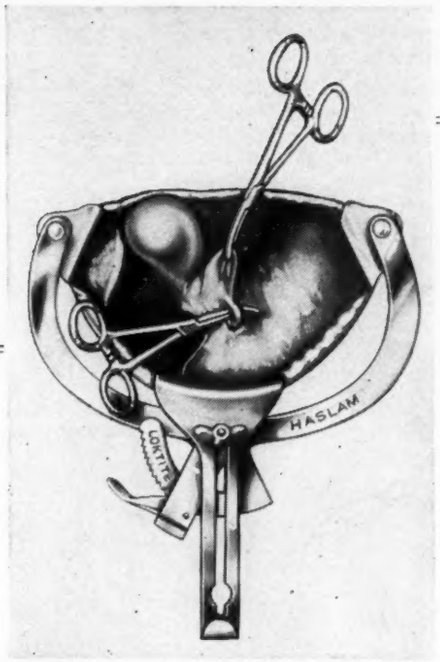
DOMEBORO TABS is listed as "BUROW'S SOLUTION-DOMEBORO TABS", on Page 376, in the "Manual of Dermatology"—issued under the auspices of the National Research Council and is recommended to be used wherever Burow's Solution is indicated.

This technique is based on a 3 point program—

1. Reduce the dermatitis with wet dressings of DOMEBORO TABS (BUROW'S SOLUTION).
2. Combat local infection and stimulate healing with thick application of DAXALAN in the center of the ulcer and surrounding areas.
3. Overcome venous insufficiency, stasis and edema by wrapping DOME-PASTE BANDAGE (Unna's Boot) around the entire leg to supply compression.

DOCTOR!
You may now prescribe
SOOTHING
Modernized — Simplified
Fresh and Stable
BUROW'S SOLUTION
1:20
in four forms
DOMEBORO
Tablets • Packets • Powder
Ointment
Write for samples and reprints from medical literature

DOME CHEMICALS, INC.
250 EAST 43rd STREET NEW YORK 17, N. Y.
Makers of the Soothing, Modernized Form of Burow's Solution
DOMEBORO—Tablets • Powder • Packets • Ointment



HASLAM *Craftsmanship*

. . . . SINCE 1848 . . . .

O'SULLIVAN
Self-retaining
Abdominal Retractor

This instrument provides good exposure in abdominal surgery and is completely self-retaining. The Lok-tite ratchet (exclusive Haslam feature) assures any degree of exposure desired. The illustration shows removal of gall bladder, with large blade in position holding stomach, duodenum and transverse colon away from under surface of liver.

Retractor complete with three blades. Made in U.S.A. entirely of

Stainless Steel

ASK YOUR SURGICAL SUPPLY DEALER FOR HASLAM No. B-1018-R

EST 1848 Haslam

FRED. HASLAM & CO., INC.

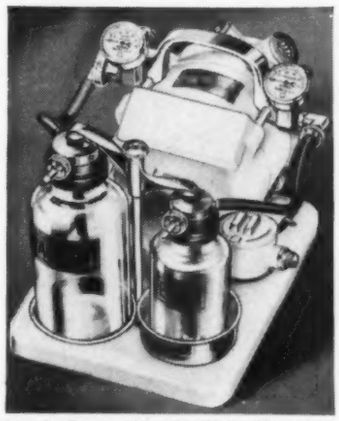
Manufacturers of FINE SURGICAL INSTRUMENTS

83 PULASKI STREET BROOKLYN 6 NEW YORK

DON'T BUY *Just "Equipment"*

BUY YEARS OF SAFE RELIABLE SERVICE

GOMCO NO. 910 SUCTION AND ETHER UNIT



- **EXPLOSION-PROOF! Heavy-duty motor and sealed-in switch approved by Underwriters' Laboratories for Class 1, Group C Hazards.**
- **ACCURATE CONTROL of the degree of suction or pressure your operation requires.**
- **PORTABLE! SPACE-SAVING! The Gomco 910 weighs only fifty pounds, takes little table space.**
- **NEAT APPEARANCE! In easily-cleaned white baked enamel or Gomco Lumitone, chrome-plated fixtures.**

Ask your dealer, or write:

GOMCO SURGICAL MANUFACTURING CORP., 834 M. E. Ferry St., Buffalo 11, N. Y.

A new catalog has just been printed. It is yours for the asking.

GOMCO EQUIPMENT

Fostering Improved Technics

Tales and Details

This month I'm full of "goodwill to men"—in medicine! Just a year ago —when this column was born—I felt like the father who looked at his new offspring and said, "Gosh, Doctor, d'ya think he'll ever pay expenses?"

Can't say how that kid turned out —but thanks to MY doctors' professional interest, this brainchild has been thriving, with particular medical attention paid to these *details!*

IMMUNE SERUM GLOBULIN (Human)—fractionated from fresh *venous* blood, water-clear and hemolysis-free with 160 mgm. per cc. of antibody-bearing gamma globulin for low volume, adjustable dosage to prevent or modify measles.

2.5 cc. **HYPERTUSSIS*** (Anti-Pertussis Serum, Human) the specific Cutter blood fraction for whooping cough—delivers 10-fold concentration of 25 cc. hyperimmune serum in 2.5 cc. volume—"a thimbleful of dosage for a handful of baby."

DERMESTHETIC OINTMENT*—for triple-action *itch-relief* with fast-acting, long-lasting and bacteriostatic ingredients—greaseless, stainless, needs no bandages.

DIP-PERT-TET* (diphtheria, pertussis, tetanus combined vaccine)—triple-immunization with highly purified toxoids plus Phase I pertussis vaccine—for concentrated antigenicity, low dosage, minimal reactivity. Plain (unprecipitated antigens) or 'Alhydrox' (aluminum hydroxide adsorbed).

HYPERCILLIN* (Procaine Penicillin G in Sesame Oil with 2% Aluminum Monostearate) offers 300,000 units per cc.—dispersed 'coated crystals' held in suspension for prolonged periods, provide smooth injection, slower absorption and therapeutic levels of at least 24 hours.

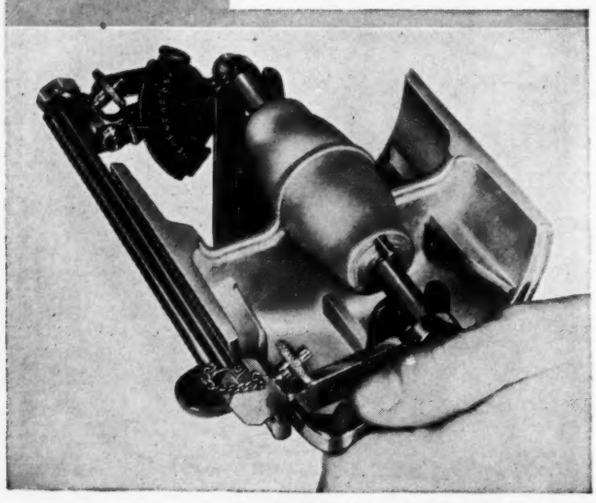
Happy holidays—and hope your New Year will be as "prosperous" as you have made my column—I'll see you next month with more details!

**Cutter Trade Name*

Your CDM

(Cutter Detail Man)

Cutter Laboratories • Berkeley 1, Calif.



THE NEW AND IMPROVED *Padgett-Hood* DERMATOME

With Aluminum Drum

By means of this unique instrument a sheet of skin of uniform thickness may be cut at a predetermined level from any area of the body as large as 4x8 inches (the size of the drum). Some of the many advantages of the improved Dermatome are: Automatic alignment of the knife edge with the drum surface; automatic setting of the knife edge in correct relation to the thickness scale; stronger adhesion of the skin to the drum and when the graft is stripped from the drum, nearly all of the cement remains on the drum. Each part of the new Dermatome is made from material most suitable for that part

The older model Dermatome, as well as a Baby Dermatome (drum size 3x8 inches) are also available as are: Cement; brush for application of cement; knives; knife handle for cutting razor grafts or honing blade; carrying case (leatherette); thickness gauge; blade holder and cold sterilizer complete with container and cover; and a knife sharpening service.

Write us today for complete catalog.

KANSAS CITY ASSEMBLAGE CO.
609 East 17th St., Kansas City 8, Mo.

ETHER is the most widely used of all general anesthetics. It is the standard with which all newer anesthetics are compared.

Mallinckrodt Ether for Anesthesia is well known for its uniform potency, purity and stability.

The perfectly tapered neck of the **Mallinckrodt** ether can accommodates a standard cork, making it easy to reseal properly.

Mallinckrodt Ether for Anesthesia is supplied in ¼-lb., ½-lb. and 5-lb. cans. Mallinckrodt's sound motion pictures "ADVENT OF ANESTHESIA" and "ETHER FOR ANESTHESIA" are available to medical societies and other professional groups. Write to our St. Louis or New York office for details.

81 Years of Service to Chemical Users

Mallinckrodt Chemical Works

Mallinckrodt Street, St. Louis 7, Mo.
72 Gold Street, New York 8, N. Y.
Chicago • Cincinnati • Cleveland • Los Angeles
Montreal • Philadelphia • San Francisco
Uniform, Dependable Purity

Triple Sulfa Cream . . .

geared for maximum effectiveness

. . . *in the treatment of bacterial vaginitis*

In bacterial vaginitis or cervicitis (whether occurring postoperatively or following childbirth or radiation), Triple Sulfa Cream* is rendering signally effective service in eradicating infection . . . healing mucosa . . . and restoring normal pH levels —primarily by virtue of its optimal bacteriostatic and bactericidal action at different specific pH levels. Healing time is frequently reduced by almost fifty percent with this simple, convenient therapy. Available at pharmacies everywhere

TRIPLE SULFA CREAM—a pleasant, water-soluble, absorptive cream containing sulfathiazole, N'acetylsulfanilamide, N'benzoylsulfanilamide, and urea peroxide.

*Trade-Mark

Ortho Pharmaceutical Corporation · Raritan, New Jersey

Makers of Gynecic Pharmaceuticals

The American Journal of Surgery

ADVERTISERS INDEX

Instruments and Apparatus

A. S. Aloe Company 10
American Cystoscope Makers, Inc. 15
American Sterilizer Company 12
Bard-Parker Co 11
Clay-Adams 28
Crescent Surgical Sales Co. ..... Nov.
Gomco Surgical Mfg. Co 39
J. E. Hanger, Inc ..... Nov.
Fred Haslam & Co., Inc 39
The Kansas City Assemblage Co 40
Kny-Scheerer Corp ..... Nov.
Geo. P. Pilling & Son Co ..... Nov.
Propper Manufacturing Co ..... Nov.
Shampaine Co ..... Nov.
J. Sklar Manufacturing Co ..... Nov.
Spencer, Inc ..... Nov.
Edward Weck & Co., Inc 17
Wilmot Castle Co 14

Sutures

Bauer & Black 8-9
Davis & Geck, Inc ..... *Insert Facing 2nd Cover*
J. A. Deknatel & Sons, Inc ..... Nov.
Ethicon Suture Laboratories ..... *Insert Facing P. 32*
Gudebrod Brothers Silk Co ..... Nov.

Pharmaceuticals

Abbott Laboratories 30
American Hospital Supply Corp 7
Baxter Laboratories 7
Bilhuber Knoll Corp ..... Nov.
Bristol Laboratories 1
Chatham Pharmaceuticals, Inc 21
Ciba Pharmaceutical Products, Inc ..... 13, *Back Cover*
Commercial Solvents Corporation 23, 25, 31
Cutter Laboratories 33, 40
Dome Chemicals, Inc 38
Eaton Laboratories, Inc ..... Nov.
Lanteen Medical Laboratories, Inc 35
Eli Lilly and Company 2
Merck & Company ..... Nov.
National Drug Co ..... Nov.
Ortho Pharmaceutical Corp 42
Parke, Davis & Co 29
Rystan Company ..... Nov.
Schering Corporation 16
Sharp & Dohme, Inc 20
E. R. Squibb & Sons 19
The Upjohn Co 22
The Vodine Co ..... Nov.
Myron L. Walker Co., Inc 27
Winthrop-Stearns, Inc 4

Hospital Supplies

A. S. Aloe Company 10
American Hospital Supply Corp 7
Clay-Adams 28
Cutter Laboratories 33, 40
Fred Haslam & Co., Inc 39
Mallinckrodt Chemical Works 41
The Pioneer Rubber Co ..... Nov.
J. Sklar Manufacturing Co ..... Nov.

Post-Graduate Instruction

Cook County Grad. Sch. of Med 36
N. Y. Polyclinic Med. School 36
George Washington University 38

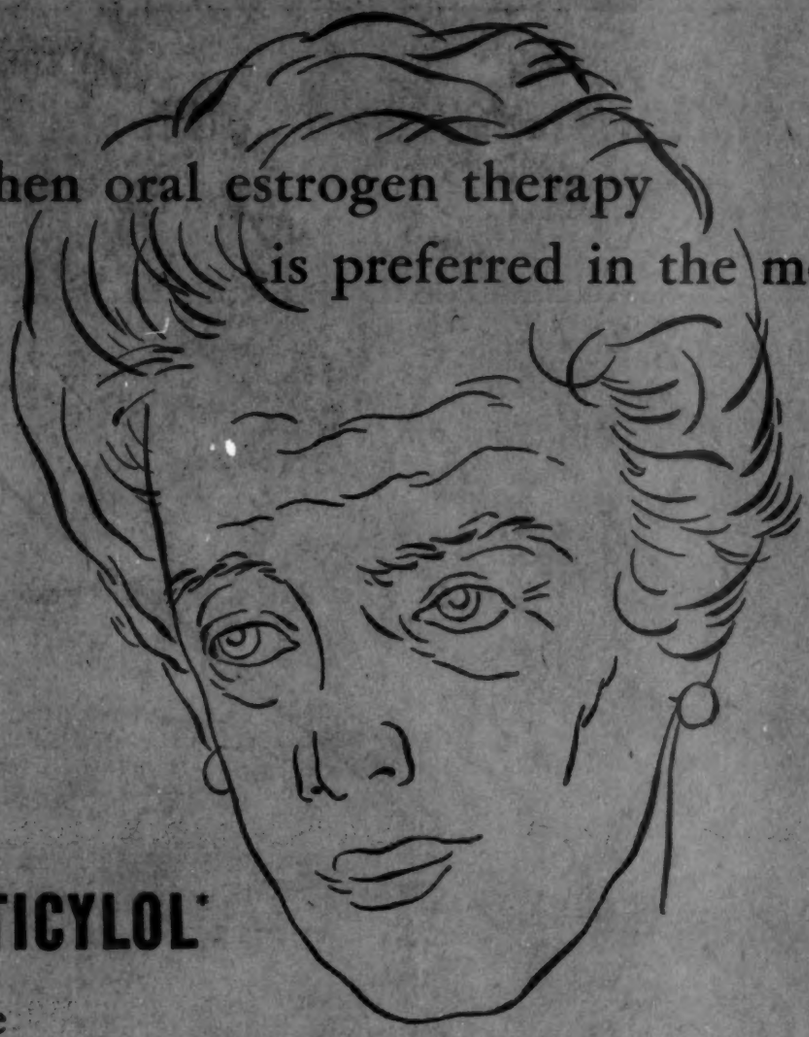
Foods

American Meat Institute 26
Cereal Institute, Inc 18
National Confectioners Assn 32
The Wander Company ..... Nov.

Miscellaneous

Outside the Ivory Tower 24, 34

when oral estrogen therapy is preferred in the menopausal patient



ETICYLOL*

the
most potent
oral estrogen

Eticylol (ethinyl estradiol) readily controls menopausal symptoms making parenteral therapy unnecessary. Only 0.05 mg. t.i.d. is required for initial doses. This may be reduced for maintenance therapy. The "sense of well-being," associated with the use of naturally occurring estrogens, is usually experienced. Few side effects occur in therapeutic doses. Exceptionally low dosage makes Eticylol the most economical steroid estrogen.

ISSUED: Tablets of 0.02 mg. (white) and 0.05 mg. (yellow) – bottles of 100 and 250.

*Formerly Ethinyl Estradiol-Ciba

• CIBA PHARMACEUTICAL PRODUCTS, INC., SUMMIT, NEW JERSEY

Ciba

ETICYLOL (brand of ethinyl estradiol) Trade Mark

2/1403M